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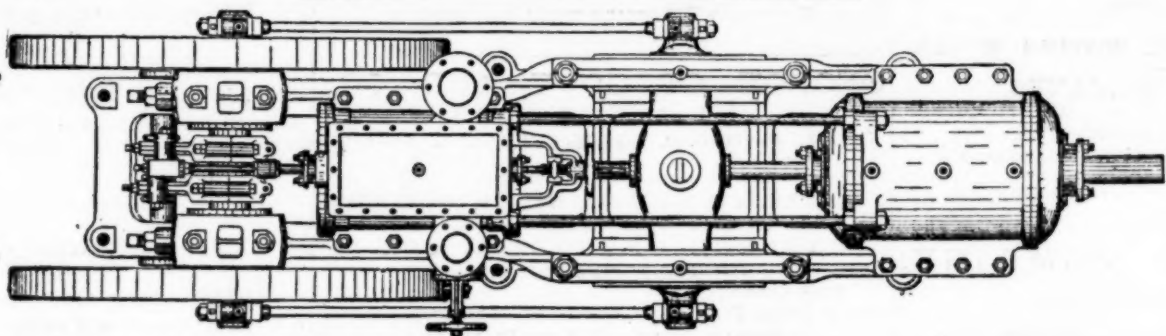
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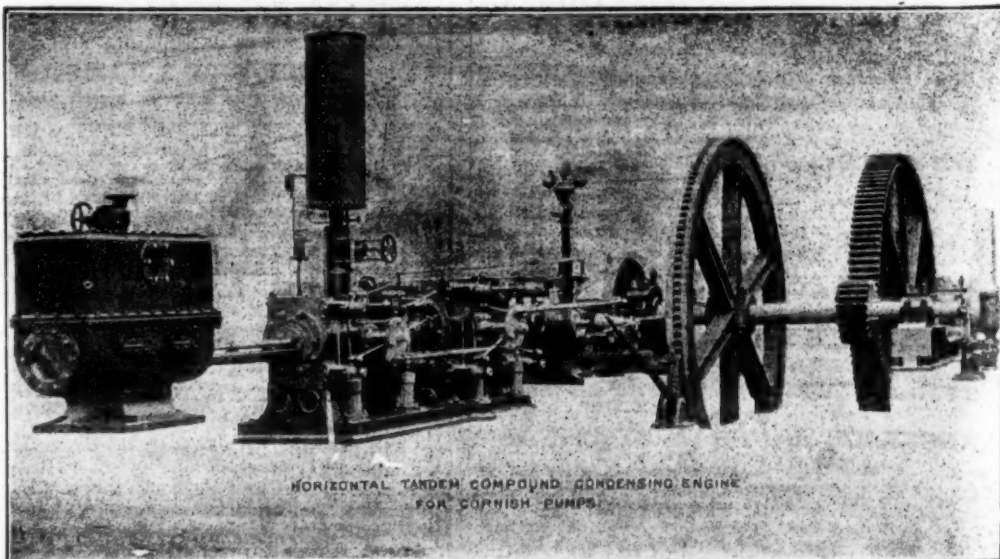
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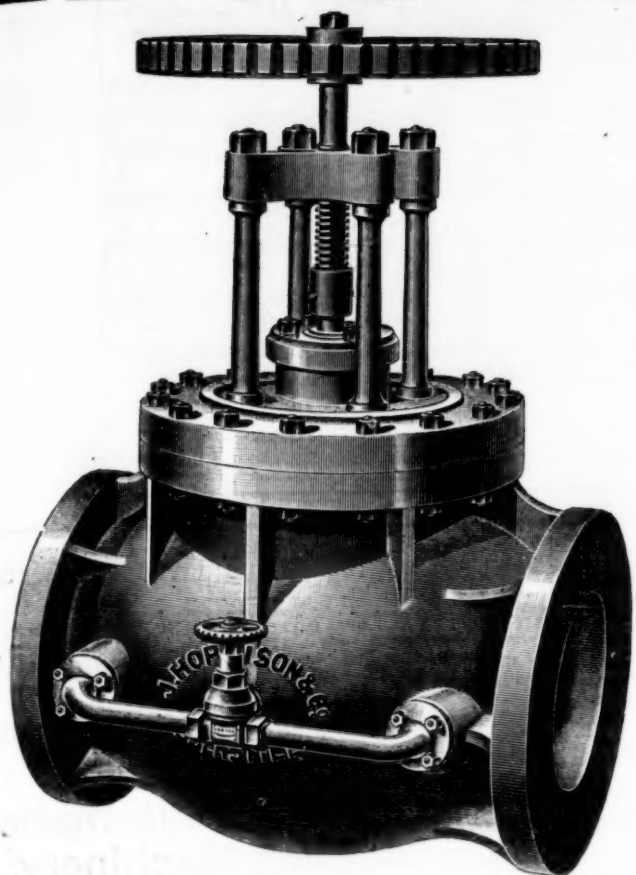


FIG. 119.

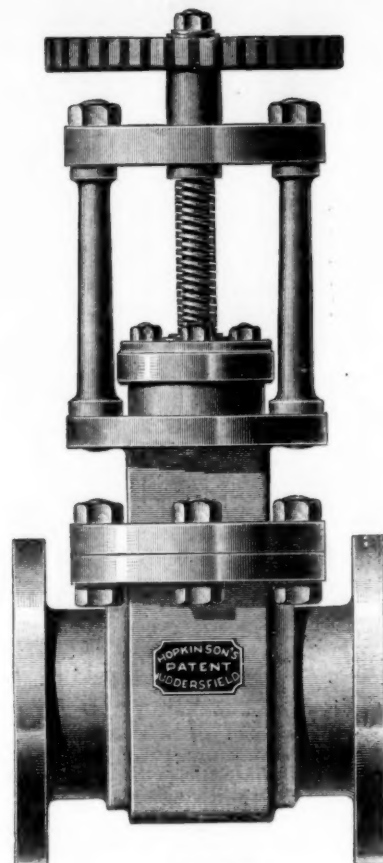


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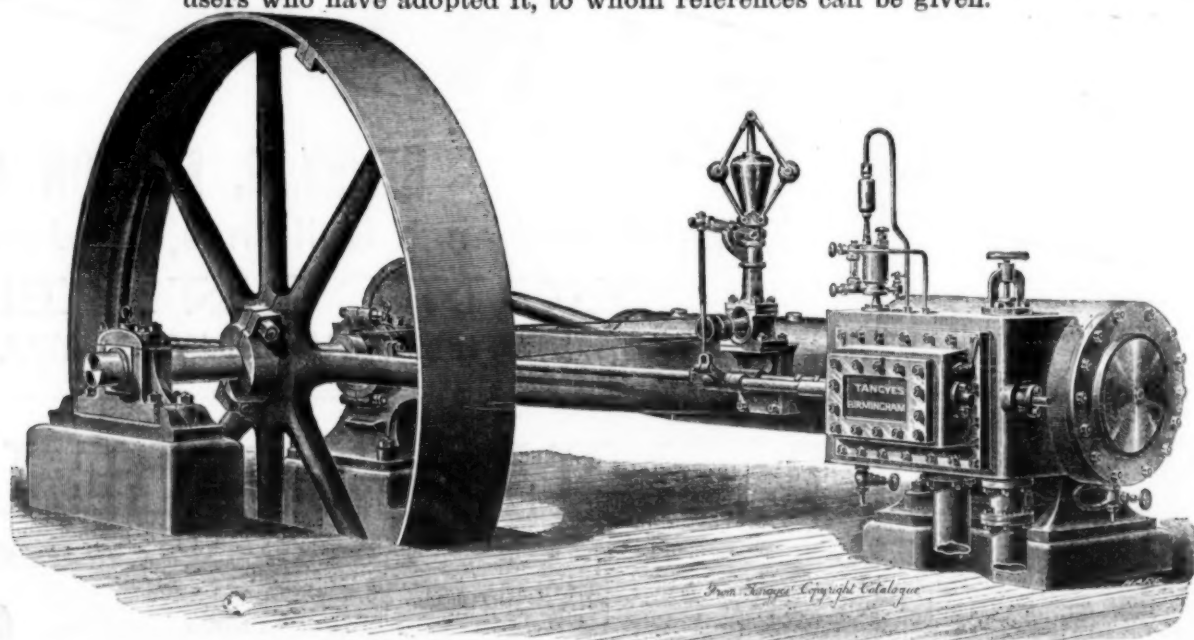
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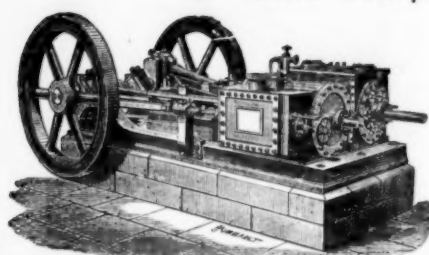
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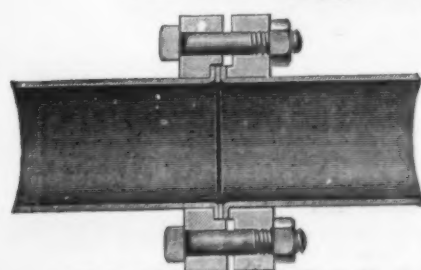
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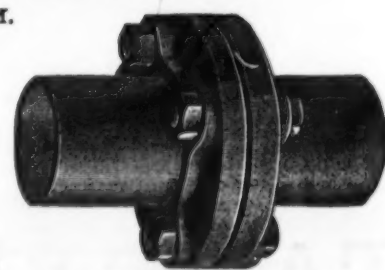
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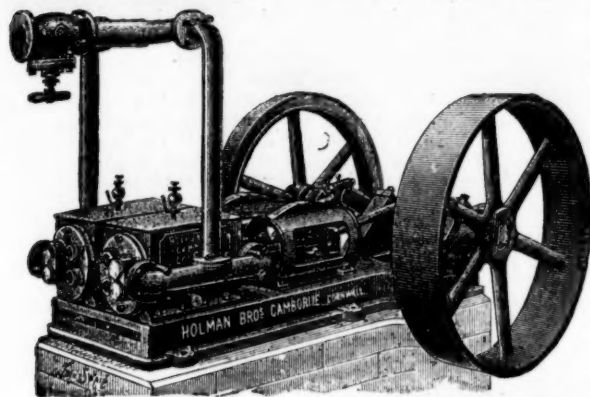
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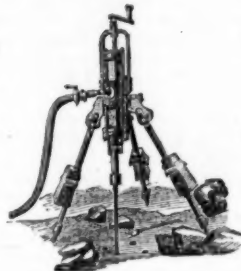
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represented.

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INVENTIONS EXHIBITION, 1885.

RECORD OF WORK DONE

At Botallack Mine, St. Just, Cornwall, **TWELVE MEN** with **TWO** new Patent **CORNISH ROCK DRILLS** drove, sunk, and rose **288 FATHOMS** in **12 MONTHS**, equal to five times the Speed of Hand Labour.

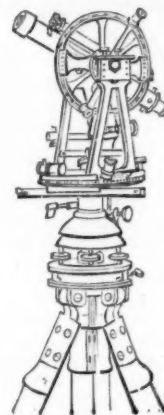
At Wheal Grenville Mine, Camborne, Cornwall, **SIX MEN** with **TWO** new Patent **CORNISH ROCK DRILLS** started from the **150 FATHOMS** level and put up in **EIGHT MONTHS** a **11 FEET** by **5 FEET PERPENDICULAR RISE** **46 FATHOMS 5 FEET 6 INCHES**, and about midway drove **1 FATHOM 5 FT.** No communication of any kind was effected until holing to the Shaft brought down from surface.

Estimates for **ROCK BORING PLANT** and **GENERAL MINING MACHINERY** on Application.

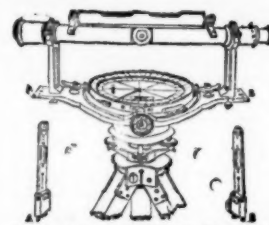
London Offices: 7 and 9, LEADENHALL BUILDINGS, E.C.

JOHN DAVIS AND SON,

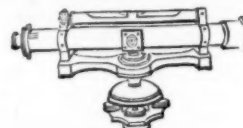
ALL SAINTS WORKS, DERBY;
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Transit Theodolite with Patent
Hoffman Tripod Head, and
Trough Compass.



Davis's Improved Hedley Dial, with
Telescope and Sights Interchangeable,
and Patent Hoffman Tripod Head.



Dumpy Level with
Hoffman Patent Tripod Head.

**MINING, SURVEYING, AND
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Davis's Improved Hedley Miners' Dials, with
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SECTION (A) MATHEMATICAL DEPARTMENT AND SAFETY LAMP
SECTION (B) ELECTRICAL DEPARTMENT.

Gold Medal Awarded Mining Exhibition, 1890.
A. B. C. CABLE CODE, 4TH EDITION.

AWARDS: CRYSTAL PALACE, 1890; TASMANIA, 1891; KIMBERLEY, 1892.

CONCENTRATION.

The Clarkson-Stanfield Concentrator (Limited).

In the CLARKSON-STANFIELD process of Concentrating Refractory and Complex Ores no water is required; dust is reduced to a minimum; the loss of Mineral through water-borne Slimes is obviated.

OUTPUT $\frac{1}{2}$ TO 2 TONS PER HOUR, ACCORDING TO SIZE OF MACHINE.

CONCENTRATOR TO BE SEEN IN OPERATION AT THE COMPANY'S ONLY ADDRESS

6, COLONIAL AVENUE, MINORIES, LONDON, E.

The Machine is superior to Sieves for Sizing Homogeneous Substances, such as Emery, Sand, and Powders, and may be used to great advantage in the preparation of Ochre.

N.B.—The owners of the Carndochan Mine, near Bala, North Wales, will, by arrangement, show their CLARKSON-STANFIELD plant working on a Refractory Low Grade Gold Ore.

NEW PATENTS.

LIST of APPLICATIONS for New Patents relating to Mining Metallurgical, Engineering, Railway and kindred matters, specially compiled from official sources for the "Mining Journal" by Messrs Rayner and Company, Patent Agents, 37, Chancery Lane, London, W.C., who will forward all information regarding them free on application.

- 14923 Samuel Earnshaw Howell, Bank Buildings, George Street, Sheffield.—Improvements in tubes for steam generators.—August 5.
- 14923 Thomas Howland, Norfolk House, Norfolk Street, London.—Improvements in or connected with boilers.—August 6.
- 14929 David Ephraim Robinson, 323, High Holborn, London.—Improvements in furnace doors.—August 6.
- 14985 Edward James Warrington, 172, Queen Victoria Street, London.—Improvements in rotary motors.—August 7.
- 14992 Thomas Harry Gardner, Edward Gardner, Lawrence Gardner, Cornbrook, Manchester.—Improvements in governors for controlling the speed of steam engines and other motors.—August 7.
- 14914 William John Brewer, 15, Victoria Street, Westminster.—Improvements in overhead conductors for electric railways and tramways.—August 7.
- 14937 Angus Cameron Gordon, 51, Chancery Lane, London.—Improvements in electric block signals for railroads.—August 8.
- 14957 James Willie Earnshaw and Walter Edward Gibbs, 4, Corporation Street, Manchester.—Improvements in water gauges for steam boilers.—August 8.
- 14980 James Dick, 9, Buchanan Street, Glasgow.—Improvements in and relating to Frue vanners for treating auriferous ores.—August 8.
- 14990 Richard Price-Williams, 24, Southampton Buildings, Chancery Lane, London.—Improvements in the manufacture of tongue rails of railway switches.—August 8.
- 14996 Reginald Heddan, 13, Buckingham Street, Strand, London.—Improvements in steam generators, and in petroleum furnaces therefor.—August 8.
- 15010 Adrian Hunt, 36, Buchanan Street, Glasgow.—Improvements in and relating to steam or vapour generators.—August 9.
- 15026 Bella Vimes, 70, Wellington Street, Glasgow.—Improvements in rotary engines.—August 9.
- 15064 Edward Sadler, 28, Southampton Buildings, Chancery Lane, London.—A fire and water-tube steam boiler.—August 9.

SPECIFICATIONS PUBLISHED.

15,068, Barker and Pearson, extracting gold from ore, &c., 1894; 14,099, Burgess, steam boilers, 1894; 15,771, Gautsch, preventing explosions in coal mines, &c., 1894; 14,504, Harrison and Pearson, steam, &c., engines, 1894; 14,910, Goetting and others, furnaces, 1894; 17,829, McCulloch, rock-drills, 1894; 15,071, Wayne, steam engine indicators, 1894; 845, Crawford, railroad gates, 1895.

TESTING MALLEABLE CASTINGS.—At present, malleable castings are tested by breaking one of them in order to see how deeply the decarburisation has penetrated, but such destruction is no longer necessary, says *La Nature*, thanks to the new Engelmeyer method of testing iron and ferrous products. On pressing a malleable casting against a fast revolving emery wheel, if the decarburisation has been sufficient, first a shell-like pencil of sparks is seen, and afterwards one in which the lines appear to separate into two or three. As, however, the emery wheel penetrates into the mass, and the carbon which has not been decarburised is reached, the sparks assume a different appearance—one resembling flowers—so that an approximate guide is given to the thickness of decarburisation.

JOINT-STOCK COMPANIES.

NEW REGISTRATIONS.

THE following are among the joint-stock companies registered at Somerset House since our last notice:—

- Austin Friars Finance Syndicate (Limited).—Registered August 12, by S. H. Smith, 48, Coleman Street, E.C. Capital £100,000, in £1 shares. Objects: To institute, enter into, carry on, assist, or participate in any financial, commercial, mercantile, manufacturing, mining, and other business, works, contracts, and undertakings, and financial operations of every description.
- Lawler's Gold Mines (Limited).—Registered August 10, by Sutton, Ommanney, and Rendall, 1 and 4, Great Winchester Street, E.C. Capital £100,000, in £1 shares. Objects: To adopt and carry into effect an agreement expressed to be made between M. Fredarson of the first part, and this company of the other part, for the acquisition of the right to purchase certain auriferous leases; to prospect and explore mines and ground supposed to contain minerals, &c., in America or elsewhere, and as miners and smelters.
- Rand d'Or Mines (Limited).—Registered August 2, by Lamley and Lumley, 15, Old Jewry Chambers, E.C. Capital £175,000, in £1 shares. Objects: To enter into an agreement with Heindorf and Co., and to acquire, develop, work, and generally turn to account any gold mines, mining rights, grants, leases, claims, concessions, &c., in the Transvaal, and as miners and smelters generally.
- Salvador Central Railway Company (Limited).—Registered August 7, by Foss and Ledman, 3, Abchurch Lane, E.C. Capital £250,000, in £20 shares. Objects: To acquire from the Central American Public Works Company (Limited) certain lines of railway, now in course of construction or already constructed, in the Republic of Salvador, Central America, and to equip, maintain, work, improve, and operate any railways, tramways, &c.
- Brookman Brothers' Boulder Gold Mining Company (Limited).—Registered August 13, by Foss and Ledman, 3, Abchurch Lane, E.C. Capital £20,000, in £1 shares. Objects: To acquire by purchase or otherwise from Brookman Brothers' Boulder Syndicate (Limited) certain gold mining leases, &c., in the colony of Victoria, Australia, or elsewhere; to develop and turn to account the same in such manner as the company shall see fit, and to carry on the business of a mining, smelting, and metallurgical company in all or any of its branches.
- Lake Carey Gold Fields (Limited).—Registered July 31 by W. J. Payne, 11, Queen Victoria Street, E.C. Capital £200,000, in £1 shares. Objects: To acquire, work, examine, and develop and lands, mines, grants, concessions, claims, leases, options, and any other property which may be acquired by the company, and to carry on the business of a mining, smelting, and metallurgical company in all its branches.
- Woodstock Gold Mine (Limited).—Registered August 2 by Slaughter and May, 18, Abchurch Lane, E.C. Capital £200,000, in £1 shares. Objects: To adopt and carry into effect an agreement expressed to be made between G. S. Gunnis of the first part and this company of the other part for the acquisition of certain mining claims situate in South Africa, and to develop and turn to account the same in such manner as the company shall deem expedient.
- Goldfontein Estates and Gold Mining Company (Limited).—Registered August 1 by J. Farrant, 30, Bucklersbury, E.C. Capital £100,000, in 2s. 6d. shares. Objects: To acquire certain gold mines, mining leases, grants, concessions, mining, water, and other rights, options, mineral properties, claims, &c., situate in the Mozambique Company's territory in Africa, to adopt and carry into effect an agreement made June 10 between R. Clement of the first part and J. Farrant, on behalf of this company, of the other part; to develop and turn to account the said properties, and to carry on the business of a mining, smelting, and metallurgical company in all its branches.

Franco-Australian Exploration Company (Limited).—Registered by Morse, Hewitt, and Farman, 37, Walbrook, E.C., with a capital of £50,000 in £100 shares. Object: To acquire any lands, mines, mining, water, and other rights, claims, leases, grants, concessions, and other property in Australia or elsewhere; with a view to the above objects, to adopt and carry into effect an agreement, made July 13, between J. de Castro of the one part, and H. Hincks, on behalf of this company, of the other part; to develop and turn to account the same, and also to promote companies for the working of the said or other lands, mines, &c., and to carry on the business of a mining, smelting, and metallurgical company in all its branches.

Hetty Gold Mine (Limited).—Registered by W. F. Spokes, 30, Bedford Row, W.C., with a capital of £100,000 in £1 shares. Object: To acquire, develop, turn to account, and deal with the mines known as the Hetty Gold Mine; to acquire by purchase or otherwise any other mines, mining, water or other rights, grants, leases, claims, concessions, metalliferous land, &c., in the South African Republic; to develop and turn to account the same in such manner as the company shall see fit; and, with a view to the above objects, to adopt and carry into effect an agreement, made July 25, between the Hetty Syndicate (Limited) of the first part, and H. R. Moore, on behalf of this company, of the other part.

CONTRACTS OPEN:

FOR MINE, QUARRY, RAILWAY, AND ENGINEERING WORK, STORES, &c.

* We shall be obliged by being promptly placed in possession of particulars regarding contracts open for competition, and of the results of successful tenders. In the latter case contract prices should be given.

The date given is that by which tenders must be delivered, in nearly all cases further information can be obtained on application at the addresses given. In applying for such the name of "The Mining Journal" should be mentioned as the original source of the information, concerning which further particulars are required.

HOME CONTRACTS.

Boiler Tubes, August 27 (India Office, S.W.).—The Secretary of State for India in Council is prepared to receive tenders to supply (1) brass boiler tubes, (2) cast-iron piping. The conditions of contract may be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W.

Pipes, September 2 (Christchurch, Han's).—For the supply and delivery of 85.0 yards of 12 inch socket pipes at Christchurch and Bournemouth East Stations, for the West Hampshire Water Company. The specification and particulars can be seen at the office of Mr. E. St. George Moore, M.I.C.E., 17, Victoria Street, S.W., engineer to the company.

Railway Construction, September 2 (Budeigh Salterton, Devon).—For the construction of a railway from the Sidmouth branch of London and South-Western Railway to Budeigh Salterton, being a length of about 5 miles 44 chains, for the Budeigh Salterton Railway Company. Plans and specifications may be seen, and forms of tender and bills of quantities obtained, at the office of Mr. William Clarke, engineer, 45, Parliament Street, Westminster.

Sinking Well, September 3 (St. Albans).—For sinking a well at Leverstock Green, for the St. Albans Rural District Council, according to specification to be seen at the office of Mr. Woodman, surveyor, St. Albans.

Railway Construction, September 24 (Manchester).—For the construction of a branch line to the Manchester Ship Canal, for the Lancashire and Yorkshire Railway Company. Plans may be seen, and quantities, with forms of tender, obtained on application at the Engineer's Office, Hunt's Bank, Manchester, on and after 28th inst.

Electric Railways, November 14 (Vienna).—The Municipality of Vienna invite plans for the construction and working of a system of electric railways in city and suburbs of Vienna. All information respecting lines, levels, and plans at Town Hall, Vienna, where applications must be made for specifications and conditions of any contract for the work in question and other details; also for permission to inspect plans of the routes to be followed.

THE QUICKSILVER MINES AND REDUCTION WORKS AT HUITZUCO, GUERRERO, MEXICO.

By EDWARD HALSE.

(Concluded from Page 982.)

THE quicksilver ore, first described in 1874 by the Mexican geologist, Mr. Mariano Barcena, much resembles stibnite in appearance, but the latter is whiter, and the former may be immediately recognised by its streak approaching wax-red in colour. The pocket was lenticular in shape, and extended from just below Las Rosas to the Espiritu Santo workings. The length along the strike was about 147 feet; the width of the pocket on the dip was about 60 feet, while the actual thickness varied from a few inches to 1 foot in the upper part, where the ore was high grade, to from 5 to 6½ feet in the lower portion, a considerable fall of grade corresponding to the increase in thickness. The lower portion of the pocket appears to be ellipsoidal, with a false dip of about 35° to the north, 52° west. It also appears to be bifurcated, or to enclose a horse of rock, whilst the richest ore would appear to have occurred on the roof branch. The average true dip was 40°. This pocket is stated to have yielded 30 tons of "pepena," or best ore (10 per cent. of mercury), and about 120 tons of ordinary ore (1½ per cent.) per week, until it was exhausted. For about 32 feet vertically below this the deposit was again flat (33°), but too poor to work (or was "on borrasca") when the second chamber or pocket known as La Esperanza was struck.

Its section on the line of the true dip is an irregular ellipse, with axis inclined 60° from the horizontal, and about 100 feet in length. The diameter measures from 30 to 50 feet. It is seen to be bifurcated, or to enclose a horse of rock from 25 to 32 feet in width. While the true dip is 60° as stated, the pocket has a false dip, the section on the line of so-called strike forming a narrow ellipse, with axis inclined 30° to north, 52° west, and 185 feet in length. The thickest ore again occurred on the roof branch. The actual thickness of ore worked was about 6½ feet. Gypsum, with patches of limestone, occurred in the upper, while limestone predominated in the lower half.

The ore consisted of more or less solid crystalline livingstonite in gypsum and limestone, and was associated with native sulphur. The ratio of "pepena" to ordinary ore and their respective yields were about the same as in the first pocket. On the western side an exploratory drift was run in several feet, some small veins ("hilos") of livingstonite having been found running in this direction, but they were lost farther in the rock, and the work was abandoned. For 197 feet, measured vertically below this, the deposit was again thin and of very low grade (dip flat or 32° and somewhat irregular), when, at the workings known as San Blas, the third and richest pocket was met with in solid and dark-grey limestone. The latter is known to the miners or "barateros" as "piedra azul," or "piedra aprieta." On the line of the true dip it is seen to form an irregular ellipse, axis inclined 45°, length 164 feet, the diameter varying from about 30 to 75 feet. It is also bifurcated, containing an irregular horse of ground consisting of rock impregnated with low grade ore, portions of which have been worked out. The best ore occurs here on the floor-branch, while the roof-branch does not appear to have been worked continuously. Towards the upper portion and centre about 30 feet of the pocket have been worked away (including the two branches), while in the lower portion 50 feet of it have been excavated in width. The average thickness was about 13 feet.

The pocket has a false dip of about 25° to south, 52° east, or in exactly the opposite direction to that of the second pocket. The yield was 75 tons "pepena" (12 per cent. mercury), and 225 tons of ordinary (1½ per cent.) ore per week. Below this the deposit has enlarged considerably, and is being worked out in immense chambers in solid dark-grey limestone rock ("piedra aprieta"). It shows a tendency to widen below, the actual size and shape of the deposit at and near the bottom is, however, only shown approximately, as ore is being stripped down all round the workings. This lower portion of the quicksilver deposit would appear to be ellipsoidal in shape with the axis dipping 45° to south, 52° west. It also has a false dip of 60° to south, 52° east. The ratio of the longer to the shorter diameter would appear to be as 2 to 1—the former being along the so-called strike ("rumbo") and the latter across the dip ("echado"). The ore is more or less evenly disseminated throughout the whole mass, but is low grade, containing on an average only about 1 per cent. of mercury. It consists of livingstonite ("metal antimonioso"), associated with stibnite ("antimonio"), selenite in transparent rhombohedral crystals, and native sulphur. Sometimes fine crystals of sulphur occur embedded in the selenite. Fine specimens of it, black and resinous, as well as bright yellow and vitreous, are sometimes found in the limestone. In addition to the above minerals, the limestone also frequently shows small cubical crystals of iron pyrites, it is, moreover, veined with calcite, and shows some quartz.

About 225 tons of ore of the above grade (1 per cent.) are being extracted from the lower workings weekly, which output could easily be doubled if necessary. The main shaft or "tiro general" was 534½ feet deep at the time of the writer's visit, and was being sunk further for the purpose of communicating with the bottom workings (187 feet below the bottom of the shaft), or total vertical depth then reached was 721½ feet. However, the mouth of the "tiro Trinidad," higher up the hill, is 99½ feet above the mouth of the "tiro general," giving an aggregate vertical depth of 820 feet for this mine at that time (October, 1894). The first portion of the main shaft is sunk in solid gypsum, at a depth of 144 feet limestone with patches of gypsum occurs, lower down more or less solid gypsum with patches of limestone is seen, while solid limestone was encountered at a depth of about 380 feet.

Probable Genesis of the Deposit.

A careful examination of this very interesting and perhaps unique quicksilver deposit would seem to indicate that it was formed by a solfataric spring charged with mercury, antimony, and iron, cutting its way to the surface, and probably having a deep-seated origin in trachytic, porphyritic or other volcanic rock, similar to those cropping out immediately to the north and north-east of Huitzuc. The volcanic spring, probably ascending the contact line between the porous and impervious rocks, and subsequently making its way along joints and fissures (or following the lines of least resistance) in the limestone rock itself, would appear to have deposited its metalliferous contents by preference in and around the denser beds, for here the solfataric spring must have taken longer to cut its way upward, and therefore, there was more time for the quicksilver ore to be deposited. This would tend to account for the large pockets of livingstonite separated by low-grade ores, and also for their bifurcated character, for the spring would naturally cut its way around the denser masses of rock rather than go straight through them. On approaching the surface, after having deposited the greater portion of the mercury and antimony in the form of livingstonite and stibnite, there would remain in the

thermal waters an excess of sulphur, no doubt in the form of sulphuretted hydrogen. A part of the sulphur, probably reduced by organic matter in the limestone, had been deposited here and there in its native state during the long journey towards the surface. Another portion, mingling with the surface waters, would become oxidised into sulphuric acid, which, attacking the limestone, has changed it layer by layer into gypsum or sulphate of lime, and for considerable distances on either side of the ascending spring until the surface was reached, forming the remarkable thermal channels known to the Guerrero miner as "trojas." What sulphur remained would be eliminated in the atmosphere as sulphuretted hydrogen (H_2S) in a gaseous form, together with carbonic acid and steam.

Mr. Barcena was of opinion that the stibnite was first present in the rock, and that it was then decomposed by thermal waters containing iron and mercury, under whose action the carbonate of lime was converted into sulphate and the stibnite into livingstonite.

This theory was based on the appearance of the deposits at and near the surface, but it is hardly borne out by the deeper workings. On the contrary, the two minerals have every appearance of having been deposited contemporaneously. The livingstonite, although frequently found in comparatively large pieces, is also often seen to be scattered through the limestone in minute crystals and specks—in fact, the rock is impregnated with it, so permeated with it that it is difficult to believe that any previously existing stibnite (and there is probably nearly as much stibnite as livingstonite in the deposit) would have remained unaltered. It is more probable, indeed, that the two minerals were deposited in the reverse order—i.e., after all the mercury had been deposited in combination with antimony, there would probably remain an excess of the latter metal, which would be subsequently deposited as stibnite pure and simple. Geologically the two minerals may be regarded as contemporaneous.

That the deep quicksilver deposit of Huitzuc was formed by a solfataric spring appears sufficiently clear when we take into account the local character and peculiar structure of the gypsum rock, the frequent presence of native sulphur from the bottom workings upwards, the numerous cylindrical channels in the gypsum connecting the quicksilver deposit with the surface of the ground, the gradual increase in size and richness of the pockets as depth is attained, and the gradual increase in size of the deposit below the last pocket. There appears to be no distinct evidence of crustification, except, may be, in the flat and narrow portion of the first pocket. The ore appears to have crystallised out in the porous spaces of the limestone itself, and only appears in crystalline masses in the larger pockets. The deposit, therefore, may be reported as an impregnation one. It is probable that the deposit is parallel to, and in depth approaches the central line of some eruptive rocks, but at what depth this eruptive rock occurs must, for the present, remain a mere matter of conjecture.

It is possible that other rich pockets of ore occur below the last, unless, indeed, the deposit continues down as a large ellipsoidal or cylindrical ore-channel to the contact-line. The filling of the surface deposits is most probably due to mechanical means. Surface denudation of the limestone and gypsum, followed by the mechanical filling up of the depressions and vertical holes with rock debris containing disseminated livingstonite and stibnite. Water-carrying carbonic acid in solution has subsequently percolated through the loose debris altering the livingstonite into barcenite, a portion of the stibnite into valentinite, and the iron pyrites into oxide of iron. The grayish-black columnar or fibrous mineral, known as barcenite, with its peculiar greenish ashy-gray streak has afterwards itself been altered partially (i.e., in patches and spots when in large lumps) or wholly (when in small pieces) into red cinnabar.

Cinnabar is said to have occurred at Huitzuc pseudomorphous after stibnite, and some fine examples of guadalcazarite ($6HgS + 2aS$) were found embedded in selenite, but both may be regarded as very rare.

The San Antonio de Padua Mine was the deepest in 1878. One rich "manto" was met with at a depth of 65 feet, and another at depth of 164 feet. The eruptive of the district is a quartziferous porphyry, and, as at Huitzuc, it comes to the surface at a considerable distance from the quicksilver mines. At Guadalcázar the porphyry rock is traversed by numerous silver-bearing veins, while the felspathic porphyry hill, about 2½ miles north-east of Huitzuc, known as Cuitlanapa, contains some veins and alluvial deposits of hematite.

Since Mr. Santiago Ramirez, the Mexican geologist, wrote his memoir on these deposits, from which most of the above particulars are taken, considerable development work has been done on them by an English company, which cannot fail to throw considerable light on their probable origin. However, so far as the writer is aware, little or nothing of any scientific value has been published about the results of the later workings.

These deposits would appear, however, to bear a considerable analogy to those of Huitzuc, and they, too, most probably had a solfataric origin, and it would appear probable that the so-called "mantos" are in reality "pockets" connected together, and that the roof and floor of the deposit have been altered to gypsum by the sulphuric acid present in the spring, as at Huitzuc.

In the Cerro de San Cayetano in the same (Guadalcázar) district there is a curious so-called cave ("cueva") in the limestone. The opening is in the form of an ellipse, 590 feet by 328 feet. It enters vertically to a depth of 20½ feet, and then dips 40° for 656 feet. The whole of the limestone is coloured by, and here and there spotted with, cinnabar. Near Xochitpec, Cuernavaca (Morelos), is likewise a curious ellipsoidal grotto, and near the Cerro de Apaxtaco, in the same district, there occurs a spring of sulphuretted hydrogen of an elliptical form, the longer axis measuring 14 feet, and the smaller 9 feet. In the waters carbonic acid is found, besides sulphuretted hydrogen, and among the fixed substances sulphate of lime, chlorides of potassium, and sodium, and free sulphur (produced by decomposition of SH_2). Here, then, we have positive evidence of a sulphur spring having formed a channel in limestone rock, which is elliptical in cross section, and the two grottoes mentioned above were most probably formed in like manner.

Method of Exploitation.

The system of working presents few features of particular interest. To a depth of nearly 300 feet the ore was taken along crosscuts to the "plata" (called "despacho" No. 1 and No. 2) in the Trinidad shaft. Below this depth it was and is hoisted up the main shaft. Some low grade ore from the second pocket, too poor to extract, is packed in the mine, being walled round with deads ("tierra de limpia" or "tecoral"), forming what is called a "caja de limpia." As already stated, the ore in the bottom is being worked out in immense chambers. The rock, limestone, is so solid that no supports are necessary. When the writer was at the mines, the ore was being carried by youths and boys ("tenateros") to the bottom of the main shaft up a kind of staircase cut in the limestone. Wicker baskets ("chichuquitos" or "chicuitos") with out handles, and strengthened at the bottom and sides with leather, were used for this purpose, being carried on the shoulders, and strapped across the forehead. When the shaft is connected with the bottom workings this primitive method

will be dispensed with, and safety-cages, here called "chalupas de seguridad," will replace the present skips ("canastros").

History.

The surface deposits were discovered in 1873, and the deeper-livingstonite deposit the following year. The first of the former discovered was that called "El Coalholote de los muertos." Mr. Thévenot purchased the mines of the discoverers (Mexicans) in 1874, and formed a company to work them, which, afterwards, coming to grief, was reformed with the aid of fresh capital. The mines were worked on the joint-stock plan for 11 years, when in 1885, they were purchased outright by Mr. Romero Rubio, Minister of the Interior, who has since worked them as a private concern. The writer examined the mines in the interests of the present owner.

Yield.

There is no doubt the mines have up to date yielded a large quantity of quicksilver, probably more than 20,000 flasks, but exact statistics are extremely difficult if not impossible to obtain. During the first year's working much quicksilver (probably 50 per cent.) was lost owing to the crude means of reduction employed.

The Reduction Works.

The ore is divided into four classes:—

1. High grade ore or "pepena," containing from 10 to 12 per cent. of mercury.
2. Low grade or ordinary ore ("metal ordinario," "comun," or "despachado"), containing about 1 per cent. of mercury.
3. Middlings or "granzas," of about the same grade as No. 2.
4. Small or "tierras," containing about 2 per cent. of mercury.

No. 1 is usually treated in the same furnace as 2 or 3, according to its size, though the wisdom of this is questionable. A higher extraction would, no doubt, be effected by reducing No. 1 by itself in iron retorts with quicklime.

Very little ore of this class was being extracted when the writer was at the mines.

The ore is charged in large lumps, and undergoes a simple calcination. The fuel is firewood, which is burnt on fireplaces on the longer sides of the furnace, the heat and products of combustion entering the shaft down the inclined passages. The mercurial vapour, antimony fumes, &c., pass out near the top of the shaft and go down an inclined plane, and then through the condensing chambers and up the inclined flue and stack. The mercury fumes, &c., pass a set of 30 condensing chambers ("camaras de condensacion") connected with each other alternately above and below, as usual, then along an inclined flue ("cañon") about 426 feet long, divided up into horizontal divisions, and afterwards up a vertical chimney ("chimenea") 32 feet high. A separate set of condensing chambers is being built for No. 2 furnace.

The air is drawn through the condensing chambers by a Roots' fan, placed at the extremity of the last one. Each furnace with 1 per cent. ore will yield about 100 flasks of mercury per month. About 90 per cent. of the quicksilver extracted condenses on the sides ("paredes") of the condensing chambers. The rest falls to the bottom ("piso") with some antimony oxide, soot, &c., forming a black ash ("ceniza"), containing about 30 per cent. of mercury in fine globules. This ash is put in a large sloping iron plate, a little water is sprinkled on it, and it is then scraped with an iron rake. When too wet quicklime is added. The residues after washing contain about 18 per cent. of mercury, and, it is said, 14 per cent. of antimony (as oxide). From 600 tons of ore about 9 tons of the washed residue will be obtained. The residues are worked into round balls ("bolas") by means of the clayey "tierras" from the Coalholote open-cast, and are reduced with the "small" in another kind of furnace. The loss in the calcination amounts to from 14 to 16 per cent. The smalls ("tierras") are treated in a small furnace, containing at the bottom of the shaft ("vaso") a number of fire-bars sloping against each other, thus Λ , and spread out like a fan, or closer together above than below. The ore is mixed with water until it is of the consistency of wet clay, and is then made into balls about 3 inches in diameter. These are dried in the sun in the "patio" or yard, and then stored in the "bodega" ready for calcination. The cost of making into balls, drying, and putting in the store room is about 60 cents (silver) per ton.

One man can make, on an average, 1·8 ton of "bolas" per day (extremes 0·8 ton to 3 tons per day). It takes four days to dry the balls in the sun, or two days for each exposed. The smalls containing much clay are mixed with others containing a good deal of sand. The furnace having been well lighted with firewood and charcoal, is charged with 900 lbs. (or three "cargas") of a mixture of balls and charcoal. Each charge consists of 300 lbs. (one "carga") of "bolas," and 25 lbs. (one "aroba") of charcoal. The capacity of the furnace is about 225 tons per month.

The mercury passes into water troughs at the foot of each of the six condensing chambers, and what remains uncondensed goes along a "cañon" about 100 feet long, and then up a chimney 40 feet high, a wood fire at the base creating the necessary draught. A furnace of 225 tons capacity, treating ½ per cent. ore, will yield from 50 to 60 flasks of mercury per month, the loss being from 10 to 12 per cent. The apparently high production is due to the addition of about 9 tons of "ceniza" from the layer furnace. The burnt "bolas" ("tierras quemadas") are brick-red in colour, and extremely hard, and contain only traces of quicksilver. The middlings, or "granzas" consisting of chips broken off when smashing up the large pieces of ore with a sledge-hammer, are treated in a double furnace of similar construction, together with larger-sized "bolas" (4 inches in diameter). A certain proportion of "granzas"—viz., one part to 17 of "bolas," is put in with every charge. Each double charge consists of about 1·5 ton in weight. The ore is first charged into a hopper on one side at the top. The outer door is then closed, and a door leading into the shaft is opened for the charge to fall down. A furnace with a capacity of 525 tons per month of ore, containing ½ per cent. of mercury, will produce from 50 to 60 flasks. The mine last year was producing about 200 flasks of mercury per month, and was making a good profit with this product. With the second furnace running the product would be about 300 flasks per month.

By making alterations in the surface arrangements, by building two small furnaces, and by introducing certain improvements in the treatment of the ore, the product could, no doubt, be largely increased. Whether it would pay to save the antimony from the low-grade ore as a by-product is questionable, considering the present low price of that metal. The quicksilver produced is consumed in Tasco and other silver districts of the Republic. Each flask ("frasco") contains 75 lbs. of quicksilver, and was worth \$60 (silver) last October. The writer does not feel himself at liberty to give details as to costs of mining, reduction, &c., or the actual amount of profit obtained.

AUSTRALIAN TIN.—The stanniferous or tin-bearing area in New South Wales is estimated at 5½ million acres, or 8500 square miles. Up to the present, most of the tin has been obtained from the New England district. The value of the tin and tin ore raised in the colony and exported, from the beginning of 1872 to the end of 1894, was £10,257,850.

MEETINGS OF MINING COMPANIES.

AUSTIN GOLD MINES, LIMITED.

An extraordinary general meeting of the members of the Austin Gold Mines (Limited) was held on Tuesday, at the Cannon-street Hotel, Mr. R. SMITH presiding.

The SECRETARY read the notice convening the meeting. The CHAIRMAN said: Gentlemen—You have heard the notice read convening this meeting, and you have doubtless all read the circular, dated August 10, which accompanied that notice. As promised in that circular, I shall now proceed to explain to you the reasons which have unfortunately necessitated our asking you to meet us to-day to pass the necessary resolutions for the reconstruction of the company. It will doubtless be in the minds of many of you that, not so very long ago—on January 28—I was addressing you on the subject of our property, and requesting your sanction to the acquisition of an additional property called the Evening Star, for which purpose you were asked to increase the capital of the company in order to enable us to make the purchase. I told you at that meeting that the information then in our possession as regards the Austin Mines satisfied the board that the encouraging statements made in the prospectus were more than justified, and that we possessed a valuable property. I come before you to-day, and say that we have no reason whatever to alter the opinions we then expressed as regards both the Austin and the Evening Star properties. You will remember that the increase of capital in connection with the purchase of the Evening Star gave us an additional working capital of £8,500, which, added to the original working capital of £9,000, made a total of £17,500, which we then considered ample until such time as the mine became self-supporting, and in this we were fully supported by the local board in Australia. The local board stipulated that they should be left entirely free in regard to the ordering and arrangement of the mine machinery, pointing out that they, being on the spot and thoroughly acquainted with the peculiar requirements of the district, were better able to order and arrange for the proper class of battery and mine machinery, and to take apparently reasonable request we in London agreed, and in response to their requirements £16,000 in all has been remitted to them, which sum considerably exceeded the estimate they supplied as to the amount which would be required before the mine commenced making returns. In the forecast (up to the end of May last) of their requirements as supplied to the London board, the local board entirely misled us, we believe quite unintentionally, for not only did we supply the amount estimated, but a very considerable sum beyond; but owing to the delay in crushing and consequent absence of returns, further liabilities were incurred, to meet which the local board requested further remittances, but which could not be supplied. It was, however, absolutely imperative in order to save the property and machinery from confiscation that at least £3,000 should be immediately found, and this amount your directors and their friends have provided. Our difficulties were further increased by the unsatisfactory crushings, particulars of which you have all had sent to you. Had the results of these crushings been as satisfactory as we were led to believe by Mr. Pirrie, the Chairman of the local board, we should not have had to call you together to-day. As to these crushings, disastrous as they have been, your board have formed a very pronounced opinion—viz., that the returns do not properly represent the true value of the ore. Whether this was the outcome of accident or design we cannot say; but we can say that the assay of this stone was given by Mr. MacIntyre, an independent assayer, as 1 ounce 14 dwts. Your directors are unchanged to-day in the opinion of our having a valuable property. On May 6 last Mr. Aldridge, the mine manager, resigned, and Mr. Williams was appointed in his stead. He bears the highest character and reputation as a mine manager. Immediately on his appointment, we directed that the first of his duties should be to make a full report on the property and machinery. This report is only to hand by yesterday's mail, and I am pleased to tell you that it is very encouraging. He speaks of the machinery in the highest praise, and sums up his report in the following words:—"In conclusion, let me state that you have a valuable mining property worthy of being prospected, when we take into consideration that over 3000 ounces of gold have been taken out of the Evening Star lease in less than 200 feet of driving." In addition to the report on the property from Mr. Williams, we considered, in view of the unsatisfactory crushings and the large expenditure of money by the local board, that a thorough examination both of the property and of the machinery should be made by an independent expert, and for this purpose we dispatched Mr. R. B. Reade, who has had considerable mining and general business experience in Australia, to the mines on July 12, of which we advised you in a circular letter dated July 11. We confidently anticipate that he will confirm to you that we have a valuable property, and, as I said before, we see no reason whatever to modify the opinion we have always held regarding it; we believe it only needs additional working capital for development purposes to bring it to a successful issue. But further funds are immediately needed, the amount found by the board and their friends being only sufficient to tide over pressing needs; the property requires protection, and money must be sent to the other side to comply with the demands of the mine. As regards our financial position, the local board are indebted on the other side for machinery, transport, and other items to the extent of about £3000. We owe here the £3000 which your directors and friends have advanced on the security of the property, to which I have previously alluded. The course we have decided to recommend—namely, reconstruction—has not yet been arrived at without mature consideration, but we are convinced that it is the best for all concerned, and we have, therefore, no hesitation in asking you to pass the resolutions which have been read to you. It is proposed that the company be reconstructed with a capital of £75,000, on the terms that the new company's shares, to the extent of 66,000 shares, be credited with 16s. paid, leaving a liability of 4s. per share, payable as 1s. on application, 1s. 6d. on allotment, and the balance in calls as and when required, subject to 30 days' notice, and that such shares be offered to shareholders *pro rata*, according to their holding. It is proposed to arrange that the issue be guaranteed by a few of the largest shareholders, in consideration of their having a call for 12 months, at par, of 9000 shares, which are not to be issued at present. The issue of the 66,000 shares will give the new company, when all is called up, the sum of £13,200. The Chairman concluded by moving the following resolution, namely:—"That it is desirable to reconstruct the company, and that with a view thereto the company be wound up voluntarily, and that Lydstone Joseph Langmead, of 23, College-hill, London, be and is hereby appointed liquidator for the purpose of such winding-up."

Mr. THURSBY seconded the resolution. Mr. BUTCHER, in the course of a long speech, reflected severely, and amid applause, upon the management of the undertaking and the manner in which the directors had come before the shareholders with the proposal for reconstruction. To send out a circular to the shareholders asking them for proxies in support of a scheme of reconstruction about which they knew absolutely nothing, was simply an insult. (Applause.) If, under the circumstances, the shareholders accepted the proposal of the board they deserved to lose every penny they had put into the company. (Hear, hear.) He was a shareholder in many mining companies, and did not expect them all to pay, but he wanted a fair run for his money, and this, he contended, he had not got. (Applause.) In conclusion, he suggested the formation of a committee of investigation.

Mr. INCE also strongly protested against the manner in which the scheme had been put before the shareholders, without supplying any information as to what it was that had brought the company into so deplorable a condition—(applause)—in something less than 12 months. He should like to know what had become of certain ore that had existed previously on the mine.

The CHAIRMAN said upon that point the board knew no more than Mr. Ince.

Mr. INCE remarked that if he were a member of the board he should have been ashamed to make such a declaration—(applause)—as this. He knew nothing, because the Chairman told him nothing. They wanted to have a committee of investigation, composed of independent gentlemen not associated with the board. (Hear, hear.)

Mr. OAKDEN said he would second an amendment for the formation of such a committee if Mr. Ince would propose it.

The SOLICITOR to the company explained that the meeting having been called for a special purpose, the resolutions of which notice had been given were the only ones that could be submitted. The voting must be either for or against those resolutions.

The CHAIRMAN remarked, however, that if the shareholders chose to nominate a representative committee, the directors would offer every facility for those gentlemen to see everything, and obtain every possible information connected with the company. (Hear, hear.)

Mr. McECHAN, formerly a member of the local board, defended the policy of the directors, and said that the property was a good one, and had been managed honourably and in the best possible manner.

The CHAIRMAN admitted that the board had made a mistake in their previous estimates of what money would be required to carry on the undertaking, but they had learned by experience. The besetting evil of the company had been want of working capital. The directors had done their very best in the management of the company, and would afford a committee of investigation every facility for inspecting the books.

Upon the resolution being put, it was carried by 19 votes to 9 (some members of the board voting), and the following resolutions were also passed:—

That the said liquidator be and is hereby authorised to consent to the registration of a new company to be named the New Austin Gold Mines (Limited), with the Memorandum and Articles of Association which have already been prepared with the priority and approval of the directors of this company.

That the draft agreement submitted to this meeting, and made between this company and its liquidator, of the one part, and the New Austin Gold Mines (Limited), of the other part, be and is hereby approved, and that the said liquidator be and is hereby authorised, pursuant to section 161 of the Companies Act, 1862, to enter into an agreement with such new company (when incorporated) in the terms of the said draft, with such (if any) modifications as the said liquidator may approve, and to carry the same into effect.

The proceedings then terminated.

THE EMMA COMPANY.

An extraordinary general meeting of the shareholders of the Emma Company was held at the Cannon-street Hotel on Monday, for the purpose of considering the report of the committee of shareholders, and the recommendations for the purchase of the property therein mentioned, and also to consider, and if thought fit, ratify a certain agreement which has been entered into by the new company for the purchase of the same, and of passing such resolutions with reference thereto as might be deemed advisable. Mr. F. W. SNELL, the liquidator, occupied the chair.

The notice convening the meeting having been read,

The CHAIRMAN: Gentlemen—You will remember that when the question of purchasing a new property for this company, upon its reconstruction, was brought forward, I said that none would be purchased until after the same was submitted to the shareholders for their approval, and I also asked you to appoint a committee to assist in the selection of properties likely to be acceptable to you. I confess I did not think there would be so much work for the committee to do as there has been, or that they would have to meet so frequently as they have been obliged to do. A great many properties (as you learn from the circular which has been sent to you) in all parts of the world, have been offered to us; their various claims have been carefully examined, and the best set aside for further consideration. From these again a few were selected, and negotiations for purchase commenced. In two cases contracts were prepared, and in a third case the contract was settled and sealed by the new company, and full particulars of the purchase set forth in the proof print of the circular sent you, when at the last moment it was withdrawn, and the circular had to be revised. The property now secured, which is in New South Wales, and is known as the Queen of the Ranges, has many elements in it which recommend it as a safe purchase. In the first place, only £1000 in cash is to be paid. The balance—£25,000—is in shares in a company which the Emma Co. (the new company) will form to work the property. The Emma Co. will find £10,000 out of £15,000 for working capital and resell at a profit. What that profit will be is a matter which the directors of the new company must determine. You will see, however, that the cash outlay (in other words, the cash risked) is not large, if the mine prove worthless; while, on the other hand, if the mine is a good one, there are enough shares to allow of a fair profit being made by the new company. Although mining is speculative, we have selected a property in which the risk has, so far as we can see, been reduced to a small point. It is not far from the celebrated Wentworth property, and is close to the railway from Sydney, so that labour and stores can be supplied at a reasonable rate, and communication with the mine can be regularly kept up. The dam is represented not so much as a store dam to catch rain, but as a convenience for working; the river is but a mile away, and, I understand, the water supply therefrom is abundant. These important matters of carriage and water are, therefore, solved. The other important matter—the all-important matter, in fact—is the prospect for gold on the property. As to this we have been supplied by the vendor with copies of the report of Mr. W. H. S. Kidmore and Mr. W. S. Coulter. Mr. Coulter reports:—"On the 10 acre block a series of shafts have been sunk, the deepest of which is 190 feet to 200 feet. At the 50 feet level in this shaft a drive south was put in for about 25 feet on a good vein, from which several crushings were taken averaging 15 dwts. to the ton. Owing to carelessness the workings caved in, and it was abandoned. Another party took it up, and continued the shaft to the present depth, 190 feet, and took out stone from which they got over 1 ounce to the ton." I want you to notice that this report shows the gold getting richer as depth is attained. But we have also something else to guide us as to value. About 300 yards from the boundary of the Queen of the Ranges is another property, which is now working, and has been for a long time. The last report which we can obtain shows that the owners of that property, at a depth of 275 feet, are obtaining gold running over 2 ounces to the ton. We have, therefore, evidence that the reef formation runs 15 dwts. at 50 feet, 1 ounce at 190 feet, and 2 ounces at 275 feet. But, further than this, we have the returns of bulk crushings in the neighbouring mine, and we find that between 1887 and 1894, 5500 tons of ore were crushed, yielding 8500 ounces, valued at £34,850. The gold is described as very pure, and selling at £1 to the ounce. I think you will agree that we have some ground for believing that this Queen of the Ranges has much to recommend it. But it is a condition of the contract that after you have ratified this purchase an independent report shall be obtained upon the property by an expert appointed by the new company, and if the report is not satisfactory we can retire from the purchase. I have now to ask you to express your opinion on the desirability of the purchase or otherwise. But before I sit down I wish to say that we have before us the particulars of some other properties, for although it contains 75 acres, it will only employ a small part of the capital at the disposal of the company, but the negotiations are not in the stage to allow of any announcement being made to-day. I hope soon that a further announcement may be made on this subject. (The Chairman here read the agreement between the vendor and the Emma Company.) Continuing, he said:—"The resolution which I will ask some shareholder presently to move is as follows:—"That this meeting, having heard the contract of August 7, 1895, between Mylius Cohen, of the one part, and the Emma Company (Limited) of the other part, for the purchase of the Queen of the Ranges property, ratifies the same." (Applause.)

The CHAIRMAN then read a report, dated May 28, 1894, and made

by Mr. W. S. Coulter, which stated that the property was about 400 yards from that of the United Jacks Company; was a continuation of the same line of reef country, and was in appearance equally auriferous. A series of shafts had been sunk on the 10 acre block, the deepest of which was 190 feet or 200 feet. At the 50 feet level in this shaft a drive south was put in for about 25 feet on a good vein, from which several crushings were taken, averaging 15 dwts. to the ton. Owing to carelessness, the workings caved in, and it was abandoned; another party took it up and continued the present depth—190 feet—and took out stone from which they got over 1 ounce to the ton. Being dissatisfied with the high rate of crushing charges, and a disagreement amongst themselves, they threw it up and it had not been worked since. With respect to another block of 25 acres, one of the proprietors of the Blue Jacket Mine had seen gold taken from a small cutting, which went 60 ounces to the ton, and he was most anxious to secure this property for himself, as he believed it to be superior to his own. Mr. Coulter, in concluding his report, said:—"From my knowledge of the Blue Jacket field, extending over eight years, I have no hesitation in saying that the Queen of the Ranges property presents all the appearance of being equally valuable, and I have the utmost confidence in recommending this property to the consideration of yourself and friends as one of value and worthy of placing capital in." Another report by Mr. W. H. Skidmore, M.E., stated that the lode consisted of felspar quartz with slate laminations, and carried a high percentage of pyritous mineral, yielding largely for gold, and was easily treated by chlorination. The stone carried a fair percentage also of free gold, which would be readily won by an ordinary stamp battery. The quartz from the present level (275 feet) of the Blue Jacket Mine yielded over 2 ounces per ton; and the ore, when compared with that of the Queen of the Ranges, was not so good in appearance. It was a really first-class stone, and, from his experience in the famous Lucknow mines, Mr. Skidmore believed this property would be a good rival to the latter. He regarded the lodes as permanent, and likely to go down for several hundred feet, furnishing years of profitable work. He had no hesitation in expressing himself thus confidently. Some extracts from a report by Professor Nicholas, F.G.S., on the Blue Jacket Mine, which adjoins the Queen of the Ranges, were here read. Professor Nicholas described the gold in the mine as very pure, and worth fully £4 per ounce. He added:—"The width of the quartz reef formation is not known, but I believe it to be over 50 feet, in any part of which quartz reef blocks of lenticular form may be found, as well as in the line or course of the main shaft reef blocks."

In 1887 the old workings were re-opened by the present owners, who have extracted from it, up to the end of 1890, 3502 tons of quartz, which yielded 5549 ounces, or an average of over 1 ounce 11 dwts. per ton." Mr. C. J. Brennan, the manager of the Commercial Bank of Sydney, Canowindra branch, stated in a letter to Mr. Coulter that much of the present prosperity of the town was attributable to the almost continuous working of the Blue Jacket Mine for the past five or six years.

On the motion of Mr. MADGE, seconded by Mr. HICKLING, the motion ratifying the contract for the purchase of the Queen of the Ranges property was, after some discussion, carried unanimously. The proceedings then terminated.

LONDON AND JOHANNESBURG SYNDICATE, LIMITED.

An extraordinary general meeting of the London and Johannesburg Syndicate (Limited) was held on Wednesday, at the Guildhall Tavern, Gresham-street, E.C., Mr. GILBERT BOWICK presiding.

The SECRETARY (Mr. Ernest Knowles) having read the notice convening the meeting,

The CHAIRMAN said it afforded him much gratification to see so large an attendance of shareholders. He was especially pleased to notice such a good representation from Paris, in which capital the interests of the shareholders were well looked after. The meeting had been called in order that the directors might have an opportunity of placing before the shareholders a statement regarding the position and prospects of the syndicate; and, at the same time, obtain their sanction to the extension of operations to West Australia. It devolved upon him, therefore, to explain briefly what they had done in the past, how their affairs stood to-day, and what they had to look forward to in the future. It was a pleasing duty that he had to perform, inasmuch as they had no errors of judgment to confess to, and, as far as he knew, there were no shadows of any kind hanging over them. The last occasion on which he had the pleasure of meeting them was when they approved of the change in name from the Anglo-French Gold Mining Syndicate to the London and Johannesburg Syndicate. This change was rendered necessary owing to the confusion caused by the increasingly large number of companies registered as Anglo-French. The legal formalities had now been complied with, and the change was duly completed. They had already paid over 200 per cent. in dividends, and that, he thought, was something to be proud of and to congratulate themselves upon. (Applause.) It was with the present, however, that they had to-day more particularly to deal, as no matter how well they had done in the past, they hoped and felt assured that they would accomplish still more in the future. Financially they had no liabilities, while all their assets stood clear. The directors had adopted a somewhat conservative policy in regard to the payment of dividends, never having divided profits up to the hilt; in fact, they had to-day in hand sufficient funds to enable them to ensure the payment of monthly interim dividends out of the profits already earned for some time to come. They hoped, moreover, also to be able to declare a substantial bonus dividend at the close of the year; for profits were steadily accumulating. As the shareholders were aware, the syndicate was largely interested in several important properties in South Africa, and he was glad to say that the reports concerning those properties are of a most favourable character. The syndicate had a resident director in the Transvaal—a gentleman of great experience in gold mining matters. This gentleman was at present visiting the properties of the syndicate, and from recent intelligence from him it was evident he was well satisfied with the condition of their affairs there. They had also an agent in Bulawayo; so altogether their interest were carefully watched in South Africa. The directors were kept regularly posted as to what was taking place there, and the results were eminently satisfactory and full of promise for the future. As regards the Nigel Extension, he expressed the greatest confidence in the future of this company, which possessed a very valuable estate, consisting of some 5000 acres, 404 acres of which (constituting the large mynpatch) the company was itself actively developing. On the rest of the estate about 2000 claims had been taken up, the licenses on which were yielding an increasing income to the company. The syndicate were not only large shareholders in that company, but they had also recently purchased from it the smaller mynpatch, comprising 140 acres (equal to about 93 claims). The report of the resident director more than confirmed that of Mr. Bates Dorsey, already published, showing as it does that development work is being satisfactorily and economically pushed forward. The Chairman proceeded to say that he had had the advantage of a conversation with Mr. Bates Dorsey on the subject of these properties, and Mr. Dorsey expressed his belief that, in addition to the gold-bearing reefs which were now being developed, coal would be struck on the southern portion of the Nigel Extension Estate, which would greatly increase the value of the property. Should this prove to be the case, a great saving in working expenses would be effected, and the value of their Nigel Extension shares would be considerably enhanced. He went on to explain that the mynpatch purchased from the Nigel Extension Company gave promise of being a very important and profitable undertaking. This acquisition had been dealt with by the incorporation of the Roodekoppen Gold Mining Company (Limited), which had been formed to acquire the property. When in South Africa lately, Mr. Bates Dorsey made a special examination of this property, and in the course of his report stated that there are seven distinct reefs running through the southern portion of the mynpatch, and that there must be more reefs undiscovered in consequence of the deep covering soil. Mr. Manning, the

REVIEWS.

DYNAMOS.

The Management of Dynamos. By G. W. Lummis-Paterson. London: Crosby Lockwood and Son.

Now that electricity has come into general use in mining, both for light and motive power, it behoves the mining man to make himself acquainted with the management of dynamos, and, to a limited extent, with the theory upon which they are built. This double object is sought in the book under review, and while just sufficient theory is given, without the too liberal use of mathematical formulæ, the practical part is eminently useful, and is clearly and distinctly written so that he who runs a dynamo may here read all that it is necessary for him to know in order to keep it in efficient work. The author at the commencement devotes a chapter to the definition of electrical units, and this is followed by one on magnetic principles, both being well illustrated by means of diagrams. These latter throughout the book are exceptionally clear, and are a great aid to the comprehension of the text.

The theory of the dynamo occupies a third chapter, and then the author proceeds to build one piece by piece, commencing with the armature, first in theory, then in practice, and afterwards treating the field magnets in the same manner, describing the different methods used for winding on the coils.

One of the most important points in connection with dynamos is the regulation of their output, so that either the voltage or the current may be maintained at a constant value, or varied as required. This subject is fully gone into in Chapter VIII., in which will be found a full description of the ordinary methods employed for regulating, separately-excited, series, shunt, and compound machines, and is followed in Chapter IX. by a careful consideration of the coupling of dynamos, from which we make an extract, in order that our readers may judge for themselves as to the author's style of treatment, and also in order that those who have charge of only one machine for their installation, may form a conception of how things are worked on a large scale. "When it is needful to generate a large and variable amount of electrical energy, as is the case in large installations and central generating stations." Under these circumstances, writes our author, "it is neither economical nor desirable that the whole of the energy should be furnished by a single dynamo. Since the efficiency of a dynamo is dependent upon its output at any moment on the load at which it is worked, the efficiency varying from 95 per cent. at full load to 80 per cent. at half load, it is obviously advisable, in order to secure the greatest economy in working, to operate any dynamo, as far as possible, at full load. Under the above circumstances, when the whole output is generated by a single dynamo, this can evidently not be effected, for the load will naturally fluctuate up and down during the working hours as the lamps, motors, &c., are switched into and out of circuit; and hence, although the dynamo may be working at full load during a certain portion of the day, at other times it may probably be working below half load, and therefore the efficiency and economy in working in such an arrangement is very low. In order to secure a maximum efficiency it is usual to divide up the generating plant into a number of units varying in size, so that as the load fluctuates it can be shifted from one dynamo to another as the exigencies of the case require, or when the load exceeds the capacity of the largest dynamo in the plant the output of the one can be added to that of another, and thus the dynamos actually at work at any moment can be operated as nearly as possible at full load." This coupling-up of dynamos cannot be effected without certain precautions being taken and in obedience to certain rules, and detailed instructions next follow for the carrying out of the work.

The actual practice of erecting and running a dynamo is fully described in Chapter X.; and as these machines, like all others, are liable to accident and breakdown from one cause or another, the final chapter in the book is devoted to their faults and the remedies to be applied when they are not of such a serious nature as to require the skilled hand of the electrical engineer. Our readers will have gathered that we are well pleased with the book. It is just what is wanted by the practical man who desires to run his dynamo, and be prepared for ordinary mishaps without having to go through a long technical training, and as such we can recommend it to mining men.

PROSPECTING.

Prospecting for Gold and Silver. By Arthur Lakes, Scranton, Pa. The Colliery Engineer Company.

We must confess that we have long harboured the gravest doubts as to the utility of any book on prospecting, or which is addressed specially to prospectors. Like the poet, the prospector is born, not made. No one who has passed even a short time in a pioneer mining camp needs to be told his general characteristics; rough-fisted, hard-headed, capable of enduring extreme hardships and fatigues when in the exercise of his calling, he is constitutionally averse to the steady daily work which the miner proper has to perform; he is incapable, or nearly so, of working for regular wages, and much prefers his precarious existence, living for months, no one—scarcely even himself—knows how, buoyed up by the hopes of "striking it rich." Add to this an almost unlimited capacity for the absorption of whiskey when he has "struck it," and there you have the typical prospector. Obviously, he is not the kind of man one would expect to find expending much of his superfluous wealth—when he has any—upon literature of any kind, and, indeed, we are very doubtful whether anyone has ever caught sight of a prospector attempting to read a book. Some of the most successful have been unable to read at all, and did not seem to miss the want of this accomplishment. We certainly cannot imagine a prospector sitting down to the perusal of the volume before us, nor do we think that he would be greatly benefited by a study of pages bristling with such terms as "metasomatic interchange," "microlites and crystallites," "andesite and phonolite," &c. The book is, in fact, a brief sketch of general geology, illustrated by examples drawn from the geology of the State of Colorado, with which the author is apparently thoroughly familiar. As a résumé in brief of the geology of that State, adapted to the comprehension of students who are at the beginning of their geological studies, the book has an undoubted value; as a general guide to the art of prospecting, we cannot praise it very highly. At the same time we must also warn students that it is apt at times to lead even them astray, the author being very negligent and slipshod in many of his statements. Thus to take one page, almost at random, we would be sorry to endorse the author's opinion that "magnetic iron ore, a common accompaniment of gold" is a "relic of the iron pyrites in which the gold was originally contained." And we should like to know how a vein—a quartz vein let us say—"becomes oxidized"; this would indeed be a phenomenon worth seeing. We must also dissent most emphatically from the author's definition of a "vein of segregation." Or, to quote another example: "Chloride, bromide, and iodide of silver are closely

related, being compounds of chlorine, bromine, iodine, and silver. It is noticeable that these salts are the elements of sea water." (The italics are ours.)

We cannot congratulate the author on either his selection or his arrangement of the minerals which he considers that the prospector needs to know, and we think that the hyper-scientific refinement that insists on giving the name of "sphalerite" as a synonym for zinc blende, is ill-matched with the carelessness that persistently writes "baryta" for barytes. On the other hand, the two chapters treating of ore deposits are very well worth reading.

It is unusual in American works to find the illustrations as poor as they are in this present book. We would particularly select Plate lxxxi. as an excellent example of what an illustration ought not to be; and from this point of view, but from this alone unfortunately, it is deserving of study from illustrators of scientific textbooks.

"THE CYANIDE PROCESS."

Our readers will remember that in the early part of this year we published the pamphlet on "The Cyanide Process," written by Dr. A. Scheidel, E.M., and circulated as Bulletin No. 5 of the California State Mining Bureau. During and since this publication, this pamphlet has attracted a great deal of attention. It was recognised by a great number as being one of the most elaborate and valuable contributions on this important subject ever written, notwithstanding the publication of the other valuable work by M. Eissler. Now that the cyanide process has attracted world-wide attention, everybody is eager to obtain all the information that is possible on this subject. Even people who know absolutely nothing of the sciences of metallurgy and mining are anxious to know something of the process which has, to a great degree, brought about a revolution in gold mining, and think that if they can only get a grasp of it from printed literature, it is a sure path to fortune. These misguided individuals are greatly to be pitied. It is not for these that such an important work as this of Dr. Scheidel has been written. We are greatly pleased that it is now published in book form, and we feel assured that when this is become known the book will have a very wide circulation. We need not repeat that we hold a very high opinion of the work. That is sufficiently evident from the fact that we have published it *in extenso*. We have only to add that the English publishers are the well-known firm of Kegan, Paul, Trench, Trübner and Co. (Limited).

"HINTS TO SPECULATORS AND INVESTORS."

Another edition—the ninth—of an interesting and, within certain limits, useful publication brought out from time to time by the well-known firm of George Gregory and Co., has just made its appearance in the form of a tastefully got-up volume of "Hints to Speculators and Investors." Citing the experience of his own enterprising firm as a starting-point, Mr. Gregory has compressed into some 400 pages of well-judged matter a surprising amount of information respecting the methods of Stock Exchange dealing, with special regard to certain recent developments in the Mining Market. As an instance of the thoroughness characterizing the production of the work, we note that the highest and lowest prices of stocks for the past 16 years are presented, while special articles, illustrated by tables of output, are given on the South African and West Australian markets. The writer makes no secret from first to last of his hope that the reader may ultimately come to do business with the firm of Gregory and Co., and makes candid promise of honourable and fair dealing in that happy eventuality. Novices in the art of speculation—for an art it undoubtedly is—might do well to consult the pages of this book before embarking on their ventures.

"THE COMPANY SECRETARY."

This is the title of a compendious book compiled by Mr. W. H. Fox, chartered accountant, of the firm of Messrs. Fox, Sissons, and Co., Austinfriars, E.C., and published by Messrs. Mee and Co., 34, Moorgate-street, E.C. At the present moment, when the number of public companies has reached an unprecedented stage, and when, in consequence, the number of company secretaries is increasing by leaps and bounds, this book has made a timely appearance, and is likely to have a large circulation. It is certainly a most valuable book, and we can heartily recommend it.

NEW ISSUE.

THE WHITEHEAD AND SULTAN GOLD MINES (LIMITED).

The Gresham Gold Exploring Syndicate (Limited) offer for subscription in the above company 60,000 shares of £1 each, out of a nominal capital of £150,000. The vendor syndicate undertake to subscribe for all shares not applied for by the public. The prospectus states:—"This company has been formed for the purpose of acquiring and working under Government mining leases two valuable gold mining properties in the Coolgardie district of Western Australia. These properties embrace an area of 54 acres or thereabouts, and are known locally as:—1. The Mount Whitehead (lease No. 3132), containing 18 acres; ditto, north-east extension, containing 6 acres; ditto, south-west extension, containing 6 acres; equal 30 acres. 2. The Sultan (lease No. 3160), containing 12 acres; ditto, north-west extension, containing 6 acres; ditto, south-east extension, containing 6 acres; equal 24 acres. Total acreage (about) 54 acres. The extensions of the above leases have been recently pegged out by Mr. Wm. Gray for the Gresham Gold Exploring Syndicate (Limited). From the reports received from the three well-known engineers, Mr. William Gray, M.E., Mr. G. R. Fearby, M.E., and Mr. John Morgan, M.E., the directors feel assured as to the great value of the properties acquired. Mr. Morgan was employed to make an independent report on the properties, and it will be seen that he not only fully endorses the high terms in which Mr. Gray and Mr. Fearby reported thereon to the vendors, but adds valuable testimony thereto. The statements contained in the prospectus respecting the properties and the work done on them, are based upon the reports above referred to, and on Messrs. Hare and Vyners' telegrams, who cabled on the 16th inst. that the amount of ore in sight in the mines was 7000 tons, that would assay 4 ounces per ton, and that the mine was looking splendid. This, at £3 15s. per ounce, would show a value of £105,000. By an arrangement with the vendor syndicate the directors have secured a working capital of £50,000. This, it is believed, is the largest working capital of any mine of similar acreage in Western Australia, and is sufficient to ensure the properties being developed and equipped in the most efficient manner. From the engineers' reports the directors believe—1. That the mines are of large acreage and of exceptional value.—2. That permanency of reef can be relied on.—3. That there are exceptional facilities for obtaining water.—4. That timber for all purposes exists in abundance."

MINING IN CORNWALL AND DEVON: NOTES ON MINING IN THE WEST.

(FROM OUR SPECIAL CORRESPONDENT.)

THE share market has not yet participated in any of those good things which certain recent events were expected by some to bring about. Speculators are, however, hopeful that they will have another opportunity of making money, and adventurers in the mines are looking with some anxiety to the time when the produce will be worth very much more than now. The delay is, however, costing a good deal of money, and heavy calls are still being made and the market remains depressed. There is not a great deal of business in the sharemarket, but this is more the result of an absence of sellers than a lack of orders. There are a number of orders which have lately been impossible of execution because of the scarcity of shares. A rise in prices would, of course, bring out a certain number of shares which are being held for the rise, but it could not be a very large number because few people can afford to dispose of their holdings, even if they were disposed to do so, at anything like present quotations.

THE difficulty between East Pool and Wheal Agar is as far from settlement as ever. The offer of the committee of the former mine to submit the whole question to arbitration has been declined by the Chairman of Wheal Agar, and there the matter stands. It is difficult to see what more East Pool can do, and in the absence of an acceptance of the offer their only alternative, if Wheal Agar persists, is to stand by and see the bottom of the mine "drowned." The deadlock is such that the only hope of solution lies in the interference of the lords—though it is greatly to be regretted that the committees cannot settle such a matter themselves—and it is understood that such interference will take place. Lord Robertes, the lord of Wheal Agar, has up to this time been indisposed to interfere, but it is not likely that he will allow himself to be made a party to any such "dog-in-the-manger" policy as the Wheal Agar executive seem bent upon. He has the power, undoubtedly, to insist on the Wheal Agar executive either working their engine or surrendering their mine, and in the latter event he can probably compel them to hand it over in fork. Amalgamation is obviously the wiser method of dealing with the thing, and we hope the interference of some outside prominent gentlemen will have the effect of bringing the two committees together with that in view.

EAST POOL meeting will be held on Monday, and some surprise has been felt at provision being made for a call. There was a balance in hand at the last meeting of £3000, so that unless an altogether unexpected loss has been sustained during the quarter, the action of the committee would seem to have been rather over-cautious. The mine is admittedly not what it was, but at the last meeting the agents seemed to think that the prospects were not especially gloomy.

THE amalgamation of Wheal Basset and South Frances is now going forward without a hitch, and will be an accomplished fact before very many weeks have passed. At the special meeting of South Frances shareholders, held at Redruth on Tuesday, Mr. J. C. Daubuz was able to announce, although there had been one or two knotty points in the negotiations between the mines, the general basis which had been agreed upon. A satisfactory feature of the scheme of amalgamation is the care that has been taken to safeguard the interests of the smaller shareholders. As Mr. Lanyon pointed out, the small shareholder will stand in as good a position as any large holder, according to his respective interest. The committee is to be congratulated on the manner in which it has conducted these delicate negotiations to a successful issue. The amalgamation will, it is to be hoped, result in the new company taking its place at an early date on the list of prosperous and dividend-paying concerns.

ALTHOUGH the existence of the Stannaries Court is threatened, it continues to discharge its functions for the present, and on Tuesday and Wednesday of this week an important case was heard before the Vice-Warden. The plaintiff was Mr. Henry Rogers, solicitor, and pursuer of East Wheal Lovel Mine, Wendron, who sued Messrs. G. F. Richards and V. B. R. Johns, the Duchy agents, for £300 damages. Plaintiff's case was that in 1893 the working of the mine, having been then suspended for nearly two years, owing to the depression, the defendants wrongfully seized and broke up the machinery and materials on the mine, and sold them at little more than old iron value. The main points to be decided were whether the engines and boilers were trade fixtures, and whether a reasonable time had elapsed before the date of seizure. The jury found for the plaintiff, and assessed the damages at £125, but Mr. Duke, who appeared for the Duchy authorities, asked the Vice-Warden to disregard the finding of the jury, on the ground that it was in conflict with the evidence. Judgment on this point was reserved, and the matter was ordered to stand over, with liberty to appeal.

COPPER ORES.

Sampled August 7, and sold at Tabb's Hotel, Redruth, August 22.

Mines.	Tons.	Price.	Mines.	Tons.	Price.
Levant	143	£2 14 6	Devon Great Consols	89	£1 15 6
ditto	142	3 10 0	ditto	72	2 7 0
ditto	141	3 10 0	ditto	65	2 6 0
ditto	140	3 12 0	East Pool	78	0 15 0
ditto	139	3 10 0	ditto	8	4 11 6
ditto	138	3 9 0	Tincoff	46	2 4 6
ditto	68	0 0 6	ditto	8	6 4 0
ditto	65	0 0 6	Bawden's Ore	33	1 13 6
ditto	9	27 15 0	So. Frances United	12	1 15 0
Devon Great Consols	104	2 0 0	ditto	22	0 2 6

TOTAL PRODUCE.

Mines.	Tons.	Amount.	Mines.	Tons.	Amount.
Levant	925	£301 5 0	Tincoff	54	£151 15 0
Devon Great Con.	330	£84 13 6	Bawden's Ore	33	£55 6 6
East Pool	88	£5 2 0	So. Frances Uni.	22	£25 5 0

Average standard £51 13 0 | Average produce 9
Average price per ton £2 16 6
Quantity of ore 1450 | Quantity of fine copper 131 tons 8 cwt.
Amount of money £410 10 0

LAST SALE.

Average standard £57 8 0 | Average produce 9%

COMPANIES BY WHOM THE ORES WERE PURCHASED.

Names.	Tons.	Amount.
Vivian and Sons	225 17½	£ 829 10 0
P. Grenfell and Sons	176½	375 7 8
Nevill, Druce, and Co.	205	653 10 0
Williams, Foster, and Co.	275 17½	837 18 0
Elliott's Metal Co.	121	213 5 0
Charles Lambert and Co.	235½	688 14 10
Liverpool Silver and Copper Co.	209	534 6 8

Total 1450 £410 10 0
The next sale will be held at Redruth on October 17.

ments with new-fangled machinery and ill-considered processes by the adoption of which, and their subsequent failure, time and money would be wasted and the ardour of the shareholders damped, finally bringing the business into disrepute and liquidation. What is required is a steady, conservative man, who will not depart from old and well-beaten tracks until he is absolutely sure that the newer and more seductive paths are free from pitfalls for the unwary, and whose judgment is based not upon hastily-considered and half-digested information, but upon the cautious enquiry which is dictated by years of experience. The presence of such a man as adviser to the board of a mining company is a safeguard to the investor, and should be a source of satisfaction to the directors.

WAIHI AND WAIKEKAURI.

NEW ZEALAND, as we have taken the opportunity of noting on several occasions of late, continues to make most encouraging progress so far as her gold mining industry is concerned. Of course, no enthusiast would go so far as to maintain that her position at present is to be compared with that of the Rand or of Western Australia. Yet it is safe to say she possesses one or two gold mines, the richness of which puts into the shade many of the most promising mines in the latter countries. In consequence of the prosperous condition of these mines, great activity prevails in the Thames district, and new licensed holdings and special claims are continually being taken up. In the Coromandel district, especially, a large area of ground previously lying idle is now being taken up, and the locality not only promises to come once more to the front, but to re-enjoy the prestige which it formerly held. This is due in a great measure—almost solely, in fact—to the wonderful richness of the Hauraki Mine, a mine which, although it has excited a great deal of interest, and has been much talked about, is strangely treated with too much neglect by the investor. No doubt the attention of the latter is too fixedly concentrated upon South African and West Australian Mines, a bias which, of course, cannot justly be blamed. But in this article we wish to call attention more particularly to the Waihi and the Waitekauri Companies. The former is an old concern formed as long ago as 1837. It is only during the last 12 months, however, that it has come so rapidly and so prominently to the front, and has given evidence of a richness which has, to some extent, exceeded the anticipations of the most sanguine. The directors of this company are in the enviable position of being able to announce to the shareholders, at short and regular intervals, information of a most encouraging nature. This week, for instance, they have issued a circular with which the shareholders ought to be, and, no doubt, will be, highly pleased. Cable advices from the mines state that in the New level (No. 2), which is 70 feet below No. 1 level, the Welcome reef has been cut through, that it is 21 feet in width, and that the first 14 feet is composed of high-grade ore, the average assays of which show a value of about £8 per ton for gold only. The Welcome reef in the face of the adit level also shows a width of 20 feet, the average assays of which show a value of 13 dwts. to the ton. In the No. 1 level it is 16 feet 6 inches wide, of the value of 11 dwts. per ton. The No. 2 level, we are also informed, is 150 feet below the adit level, which shows that there is an enormous addition of payable ore to the resources of the mine. The No. 2 level is being continued towards the Martha main lode, and on the 16th inst. there remained a distance of 31 feet to reach the lode. Unofficial information from the spot confirms the fact that the property is one of great and increasing value, and that there is every reason for shareholders to anticipate a steady and payable yield for a long time to come. The company possesses a magnificent plant, which is not only in splendid order, but is in full operation; whilst the new addition to the reduction plant, we learn, is giving entire satisfaction to the manager.

The Waitekauri, on the other hand, is only of recent formation. It was incorporated as late as May last, and the whole of the shares, which are paid-up, and which stand at a fair premium, were taken up by private subscription. The properties which the company has acquired are situated in the Waitekauri district, which is about 5 miles north-west of the Waihi Mine. One of the properties is called the Golden Cross Mine, which was formerly owned and partially developed by the Golden Cross Mining Company. It is about 100 acres in extent, and upon it a considerable amount of work has been done. In the future it is intended to work the Golden Cross lode at lower levels through a tunnel to be driven from the adjacent country through the property, cutting the main lode at about 300 feet below the lowest level now being driven, which is about 100 feet below "Corbett's" level, and to connect this tunnel by a tram-road with the company's large mill. This tunnel is a work of such importance that the Government, recognising its value, have made a special reserve of 100 acres adjoining the line of the tunnel, and given the Waitekauri Company the right within three years to take up mining rights upon any lodes which may be cut in the tunnel. This concession practically secures to the company mining rights over an area of 300 acres in connection with the Golden Cross lode and any other lodes in their special claims, or that may be found in the tunnel. It is said other large lodes exist in the special claims, but they have not yet been explored. The other properties acquired by the company are called the Komata group, which formerly belonged to the Komata Gold Mining Company, and they cover a mining area, it is said, of 102 acres, with a length of about 1500 feet upon the strike of the reef. While in the hands of the Komata Company 5210 tons were crushed for a yield of £23,160.

In former articles which we have written upon the gold mining industry of New Zealand, we have always advocated the policy of adopting the cyanide process for the treatment of the gold ores. As we have pointed out, there are plenty of these latter existing; but, unfortunately, they are of a low-grade character and the great problem and the great drawback have

been to find a suitable process for extracting the gold in payable quantities. Many processes have been introduced and have been found wanting, and it is only at the last moment that the cyanide process has been welcomed. Although this has been so greatly successful in South Africa, it does not follow that it will meet with similar success in New Zealand. It can only be tried. We are glad to say, however, that the directors of the Waitekauri Company are taking the "bull by the horns." After protracted negotiations they have succeeded in making an arrangement with the Cassell Gold Extracting Company for the use of the latter's cyanide process, and it is to be hoped that the company will reap great benefit from this. As in the case of the Waihi Company, we receive from unofficial sources favourable accounts of the progress already made by this company, and the opinion out in New Zealand seems to be that it is destined to become a most flourishing undertaking.

NOTES AND COMMENTS.

IN our leading article last week upon the Londonderry Company we expressed it as our opinion that the explanation given by Colonel North of the delay in publishing the famous telegram from Lord Fingall was ingenious, and one with which we were not altogether satisfied. Had Colonel North's wish been carried out the wording of that message would not have been made known, but simply a notification to the effect that unsatisfactory news had been received from the mine. It was Mr. Plunkett—the gentleman representing Lord Fingall on the board during the latter's absence in West Australia—who insisted upon the publication of the telegram in the precise terms in which it was received. Whilst we blame Colonel North, we praise Mr. Plunkett, for the latter's action was certainly the more straightforward. The latter has this week communicated to the Press his intention of resigning, and for two reasons. In the first place, because the return of Lord Fingall, whom he represented, no longer necessitates his presence on the board; in the second place, because "what I conceive," he says, "to be the interest of the shareholders no longer compels me to endure the conduct of the Chairman towards Lord Fingall and myself." Those who attended the meeting last week will be ready to sympathise with Mr. Plunkett, for Colonel North adopted an attitude towards these gentlemen which was certainly unjustifiable. Unless the Colonel acts a little more considerately in future, he will run the risk of embittering others against him.

THE Emma Company is a concern with which we cannot conjure. Ever since its inception, in the year 1871, its career has been one of continual failure. Losses have been monotonously regular. Let us hope, however, that it has now turned the corner. It must be admitted that its future seems more hopeful and bright than has been the case for several years past. No one, of course, can prophesy with certainty how the new property which it is about to purchase will turn out. One thing in its favour—but one, we must admit, which does not make us very sanguine—is the small consideration which will be paid for it. In the first place, only £1000 in cash is to be paid. The balance of £25,000 is in shares in the company which will be formed to work the property. As the Chairman pointed out at the meeting held this week, should the property prove worthless, no considerable loss will result. Everyone interested seems to be much impressed with the favourable reports made by the experts who have examined the property, which are certainly highly encouraging. Considering the tendency of the times, it seems a little remarkable that the new property acquired is not in Western Australia. However, it is somewhere in Australia—viz., in New South Wales. For some time now the latter colony has not made itself prominent on the English market. Nevertheless, it seems to be regaining its old prestige, for not a little evidence has been received testifying to its remarkable gold wealth. Let us hope, therefore, that the Emma Company have purchased a valuable mine, one destined to introduce many other valuable properties from the colony of New South Wales.

AFTER suffering from unjustifiable neglect for some years past, Australia is coming to the front in a manner which is rapidly making up for the time she has lost. The Western part of the continent, of course, leads the way, and is certainly likely to be in the van for a long time to come. Nevertheless, the other colonies, though in a more modest way, are giving strong titles to public attention. For some weeks past we have, editorially and otherwise, been advocating the claims of Victoria, New South Wales, and Queensland. In the case of the former, especially, we have shown that the neglect from which she has suffered has been absolutely incommensurate with her wealth in gold. There are in this colony numerous properties of remarkable richness, and yielding profits and dividends which would give satisfaction to the most avaricious investor. During the week two meetings of two companies possessing properties in Victoria have been held—viz., the Black Horse Extended Proprietary Syndicate, and the Great Sandstone United. The latter was formed in 1891, and the former in the year following. At the time of their formation high opinions were held of their value and prospects. Anticipations have, however, to some extent been unrealised. This appears to be no fault of the individual properties. The great drawback has been the want of capital—a drawback powerful enough to ruin the most promising of mines. Unfortunately for these companies, the time at which they were formed was a time of great and general depression. One of the most difficult things was to get capital for any enterprise, and, therefore, no exception was made in the case of these two companies. Times are now different. Capital is now as plentiful as then it was scarce, and naturally the directors are rejoicing in anticipation of the results that are likely to follow the provision of this paramount essential. A scheme has been formulated and wisely

adopted for the amalgamation of these two concerns, and there is every likelihood that they will meet with the success to which everyone is looking forward.

WITH the open-handed generosity which distinguishes his class, an American journalist has gratuitously presented the brilliant artist of the "Prehistoric Peeps" with a hint that may hereafter be turned to rich account. Certainly no industry or calling reaches further back into the remoter periods of the world's history than mining, and there is assuredly none more fitted for striking and vivid treatment by the able pen of Mr. Reid. It might conceivably be objected that the subject appeals to a comparatively limited public, and that the general run of individuals would not be sufficiently acquainted with modern mining to appreciate to the full extent the difference in methods and machinery between the days of La Neve Foster and those of the Queen of Sheba. The objection must carry some weight, but the imagination of Mr. Reid might safely be relied upon to counterbalance it. The queer cast of the countenances he depicts, the wealth of diluvian monsters with which his pages abound, and the grotesque situation and incident always at his command might give the illustration two sides—one for the generality of men, and another, which would be widely appreciated, for the School of Mines. The artist need by no means confine himself to the probably pre-historic copper mine recently discovered in the Big Hole mountains by two Butte prospectors, and which really was instrumental in leading our Transatlantic confrère to originate the brilliant suggestion to which we have alluded. He might confidently be permitted to suit himself as to place and country, and also as to time, with the understanding, of course, that he did not go quite back to the nebular.

THE original discovery is worth describing. Some prospectors, wandering about in the mountains some 60 miles south-east of Butte, came upon traces of a copper ledge, and while probing for the ledge itself broke into a well-defined tunnel, leading thence to a mine, developed to a considerable extent, and bearing full traces of having been systematically worked at some period far back in the dark ages. According to one account, "the tunnel was walled with blocks of stone, and the roof was supported by large flat stones in a primitive but secure manner. At the mouth of the tunnel there was an immense pine tree, which must have grown after the works had been abandoned, and the implements that were found were all made of stone, such as have been discovered in the prehistoric mounds of the Mississippi valley." Confirmation of this exceptional piece of fortune is yet to seek; but, putting aside the admirably inventive faculty of the average New Englander, there is nothing about the story that need excite incredulity. That the early races of some more southerly latitudes went in largely for mining is a fact as widely known as it is authoritatively authenticated; and how far north the mining spirit may have penetrated is still a matter of conjecture. There is, however, no ground for doubting that the mines of the more Western States have been worked ages ago, although the absence of anything like a connected record necessarily involves the question in a good deal of haze. It can easily be understood that American archaeological circles are much exercised about the discovery.

ONE of the German trade papers has recently published an article, in which it discusses in a broad and comprehensive spirit the question of assaying, and lays down the lines upon which reliable and trustworthy assays can alone be obtained. The chief point elucidated is no new discovery on the part of the writer, but has over and over again received the careful attention of competent authorities. The accuracy of the assay as a correct gauge of the productiveness of a mine depends more upon the judgment and skill exercised in the selection of samples than anything else. No one at all acquainted with the process in question will require to be told that by an ingenious picking of ore the most sterile and barren ledge of rock would probably lend itself to the production of more or less encouraging assays; while, on the other hand, though the fact does not often receive practical illustration, there have undoubtedly been cases in which a valuable gold mine has been put upon bad terms with the public through the handiwork of an incompetent assayer, whose averages have gone far below the property's real capabilities. It is obvious at once that no mere wandering aimlessly through a mine for the selection at hazard of pieces of rock and quartz can really lead to any reliable indication of a mine's value. The truth is that the process of assaying is one much more delicate and elaborate than mining men seem to be aware of. Sampling the reef at regular intervals alone entails considerable labour, and the numerous occasions upon which the results are subsequently disproved shows that, as generally performed, the work is worse than useless. But, after all, the remedy substantially lies in the hands of the directors, who should have a care never to employ mining men who are not of the first reputation, and whose figures will not bear the most rigid comparison with after revelations.

ONE of those passing waves of popular attention that are continually shifting from object to object is now, for the moment, bringing the Kootenay mining district of British Columbia into prominence. The country is, roughly speaking, a parallelogram in form, 160 miles long by 60 miles broad, and crossed by three parallel mountain ranges. Placer and quartz mining were both carried on by the early inhabitants of the country, working with such primitive methods and appliances as come naturally to the hands of the pioneer mineral workers. The existence of very rich ground—ground carrying mineral in proportions large enough to attract the attention and open the eyes of the mere novice—has been verified more than once, and the resultant work of prospecting has been carried out on a very large scale. For the present the chief difficulty, according to the local scribbles, appears to be involved in the evident necessity for the introduction of outside capital, if the deposits in the country

are to be turned to much practical account. Most of the outside support the colony has so far received comes from America, but it can easily be understood that the colonists would rather work in co-operation with English people, and see the British turning the resources of the country to profit, than open the doors to the spirited and enterprising Yankee. Whether their wish will ultimately become realised is, perhaps, a question, but in any case, the field looks a fairly-promising venture, and one that should not altogether escape the keen and comprehensive glance of the capitalist.

SHAREHOLDERS in industrial joint-stock companies, anxious about their dividends, should beware of the information that some of the largest American and Continental iron and steel works have of late been remodelled, with the object of substituting unskilled labour for more expensive wage earners to a much greater degree than has hitherto attached to the productive processes. The object in view has been the reducing of costs of manufacture, and the perfection to which the labour-saving policy has been carried out is stated, in some cases, to have been absolutely marvellous. New machinery has been laid down, the like of which has never before been suspected. It is this circumstance which in part accounts for the unprecedentedly low prices that have recently prevailed in the American and Continental trades, and which have yet left a profit to a few of the biggest works. If this sort of thing goes on, joint-stock companies at home will certainly have to look to their laurels in the matter of works' equipment, otherwise the difficulties, already grave enough in the matter of earning dividends, will, in face of the added manufacturing capabilities of the other countries, be unquestionably increased. Sufficient confidence in the future of trade should be exhibited by shareholders to stimulate them to spend money in machinery and plant equipment. To sacrifice works' efficiency to dividends is a course of action which needs to be reconsidered.

SPECULATORS in tin shares who have been watching the Welsh market of late make known that at the present time our shipments of tin-plates are little more than two-thirds of what they were four or five years since. The average monthly shipments during 1890 and 1891 were about 27,500 tons; for the seven months of this year they were under 18,000 tons. This means about 150,000 tons of tin bars less per annum, and the question to be settled in the future is whether the United States will not make all the tin-plates she requires. At present, it is estimated that the works in operation, together with those in course of erection, are able to make at least one-half of the present consumption of tin-plates in America. This is estimated at 7,000,000 boxes, or about 350,000 tons. Fortunately, the consumption of tin-plates in countries other than America is rapidly growing, but, at present, it is only about 12,000 tons per month, or about 150,000 tons per annum.

MUCH interest and comment is being excited by the attitude of the French Government and its representatives towards mining investments in South Africa, towards which the favour of the French nation is strongly setting. Those who are at all familiar with mining questions cannot fail to be aware that of all the gold fields in the world there is none which excels—even if there is any which equals—South Africa in point of solid reputation and permanency. The field has been systematically worked for so long a time, and the results have been so brilliant, and at the same time so regularly sustained, that if the word "investment" rather than "speculation" is ever justly applicable to mining, surely it would be to South African mining. For some reason, however, the French authorities are by no means favourably disposed towards the Rand and Charterland. Thus the despatch of M. Robillaz to report upon the former field is made the occasion of a good many, perhaps unfounded, accusations of prejudgment. The French Commissioner, it is said, starts upon his journey strongly biased against the Rand mining industry. Two things are, however, certain, even at this early stage in the affair. The first is, that M. Robillaz will find it hard to speak pessimistically of a field with so high a reputation as the Rand; and, secondly, if he were to do so, his utterances would fall ineffectually upon the ears of those who had any certain and technical knowledge of the district to start with.

THE attitude of the French representatives in South Africa upon the question of investments in that country is sufficiently shown by a letter written by M. Aubert, French Consul at Pretoria, in reply to a correspondent who had been injudicious enough to invite his opinion upon Chartered. M. Aubert can find nothing better to say about an undertaking that is now a prime favourite upon the London market, and whose rise has been one of the most pronounced features of market movements during the past months, than that "mon opinion bien net sur la Compagnie dont vous me parlez, est qu'on cherche par tous les moyens à jeter de la poudre aux yeux du public ignorant, mais qu'il, en Afrique, on considère l'entreprise comme une immense filouterie, au point de vue financier, industriel, commercial et agricole. Personne ne songera jamais ici à mettre son argent dans cette affaire." It is not a pleasant matter to impute motives, more especially in the case of an official representative of a foreign power, but at the same time it is difficult to peruse the terms in which the Consul seeks to damage the reputation of the Chartered Company as an industrial enterprise, without believing that political hostility has something to do with their inception. No doubt it must be irritating enough to the Gallic mind to reflect upon the strides in colonisation which England is making in South Africa under the able initiative of Mr. Cecil Rhodes. Had the Chartered Company been of French origin M. Aubert might have other words than "filouterie" to apply to it. Of course, the sober judgment of the Paris industrial Press repudiates altogether this "intemperance of language," which cannot do much good to France, and certainly can do ourselves no harm.

NORTHERN shale oil producers have been very advantageously affected by the sudden and generally unexpected fall in the

United States' production. The consequence of the removal of so formidable a competitor from the field of enterprise has been to brighten greatly the prospects of the Scotch branch of the industry, which now depends more upon the action of Russian producers than anything else. From the Scotch point of view, the most pleasing circumstance about the falling-off in American production is that it is seemingly due to natural causes, likely to be permanent. Prices latterly have risen considerably, and, in addition, the manufacturers are now feeling the full effects of the greater economy in working forced upon them by the pressure of hard times. During the years of trade depression Scotch producers stuck grimly on at the work of coping with harder conditions, in a manner to justify the encomiums passed upon the British national character by French visitors to our shores like M. Daudet, and now, in the result, perseverance and foresight are reaping, as was inevitable, their full reward. The history of the development of this particular industry is one long record of plucky fighting against obstacles, which many might have deemed insuperable. It was a long war against adverse natural and commercial conditions, and the eventual triumph is another bright page in the history of British commercial achievements.

So far, the project of settling all labour disputes by means of a conciliation board has not been very successfully applied in practice. The labour representatives, in many cases, came prejudiced against the arrangement, and, with that suspicion which often accompanies ignorance, were morbidly acute in their criticisms of the actions of the opposite party. From the very beginning, chiefly owing to this cause, the machinery worked heavily, and gave occasion to considerable friction. By the exercise of extreme caution, the more amicably-disposed leaders of both sides succeeded in steering successfully for a time among the shoals and quicksands of compromise and conciliation, and several disputes were adjusted before they got to maturity, while others that had been raging for a considerable time were set at rest also. After remaining in obscurity for some months, the matter has at length cropped up again in a proposal to form a conciliation board for the Lancashire district. This time the suggestion came from the men, and was unfavourably received by the masters, who inclined to the belief that sufficient machinery was already in existence for the settlement of all disputes likely to arise in the Northern county. No doubt the smooth and amiable working of the conciliation boards depends directly upon their simplicity of formation, and would be likely to be seriously threatened by anything like complexity and intricacy in their design. It is possible, then, that in refusing to add to the existing appliances for the maintenance of the peace the masters were right. In any case, their answer has relegated the matter again to oblivion for some time.

THE MINING MARKET.

FRIDAY EVENING.

Contractions in business.—A partial reaction, followed by recovery.—The closing strong.—De Beers a prominent feature.

OWING in no small degree to the semi-tropical weather, and the jaded state into which almost everyone has fallen, the Mining Market has become distinctly quieter. Less excitement has not, however, prevented what, in a normal period, would be considered as a large business from being concluded, only the disposition has been to pause in putting up prices, and to take, where possible, some rest, which, under the circumstances, and having regard to a difficulty in previously securing a holiday, is at once wise, and even necessary. Therefore the fluctuations have not been so numerous, and a partial fall has occurred. This would have been of a more general character had a rebound not occurred during Thursday afternoon, and which developed into a decided recovery to-day. The effect has, therefore, been to practically restore quotations to their former level, and this fact is another hint of the immense strength behind the market, which, moreover, is admirably controlled, while Continental support shows no sign of being on the wane. It is, however, quite possible that as the account open is obviously very extensive, difficulty may be experienced on Monday in carrying over commitments now in weak hands, though the preliminary "shake out" must have, at least, induced the closing of many small accounts open for a rise. Needless to say, any reaction is a healthy symptom, and cannot possibly do any harm in a market always broadening out, and containing elements that have already produced a gold mining craze, and may later result in a universal mania.

The chief incident on Monday was the return of Mr. Barnato to Throgmorton-street, who, instead of raising quotations, as expected, dropped upon those who were responsible for premature dealings in his new hybrid undertaking, the British and International Banking and Finance Corporation, which has a capital of £2,000,000, in £1 shares. Already the first issue has been subscribed for several times over at a more or less substantial premium, but, by mutual agreement, dealings in shares on the market have been declared "off." However, all the Barnato stocks were strong, though many others were lower, including West Australian. There was a comparatively small amount of business on Tuesday, when De Beers were a leading feature; Horsa-ham Monitor further advanced, and a majority elsewhere declined. A general reduction was the point of Wednesday, Gold Fields being especially heavy, and nearly all the other shares participated in the downward movement, owing to fears (among a section) that the jobbers might refuse to carry-over at all next time. Many descriptions were freely offered during Thursday morning, though it was conspicuous that the Continent sold little or nothing, and a rather smart fall ensued. But after lunch a rapid recovery set in, led by De Beers and Gold Fields, and these among a few others rose on the day. Westerals remained dull. As already stated, a general advance took place to-day, although again subject to realisations to secure profits, and after being dull at midday, fresh strength was developed, the average closing being active and firmer.

South African Shares.

Whatever irregularity and disturbances have occurred, quotations do not this evening bear much evidence, for the greater part of the previous weakness has been recovered, and on balance not a few exhibit a rise compared with Friday last, notably in Randfontein, Simmer and Jack, Gold Fields of South Africa, and Jumpers Shares, but altogether there

has not been a great deal of fresh dealing. Randfontein have, however, risen to 4 on active buying from Paris, City and Suburbans to 26, Harlots to 11½, Langlaagte to 8½, Nigels to 7½, Simmer and Jack to 19, Wemmers to 11½. New Primrose have been dealt in at close upon 8, but have fallen since to 7½. Langlaagte Stars have fallen to about 3, but May Consolidateds rose to 4, otherwise the changes have not been important, except that Modderfontein fell from 15 to 14. Shebas have been also weak at 2½. Transvaal Gold shares have improved to over 9. Johannesburg Investments have been dealt in up to 6½, Barnato Consols have risen to 5½, London and Paris Investments to 3½, and Robinson Banks are 11½. Rhodesia shares have been largely bid for, Rhodesias up to 18, Rand Rhodesia to 2½, Torva Exploring to nearly 2, and most other shares of the group have risen substantially. Chartered shares have fluctuated between 6½ and 7½, closing at about 7½ to 7¾.

The Statist recently had some pertinent remarks on the late rapid advance in Chartered which the public might consider. Quoth our sapient contemporary.—As the shareholders are likely to derive their income from interests in mines it is worth while pointing out that to pay a dividend of 5 per cent. on over £17,000,000 (representing 2,500,000 shares at 7) requires £850,000 per annum, therefore, as the company will possess about one-third interest in all mines working in the country, it follows that the total profit so taken from mining must be £2,550,000 per annum before the Chartered shareholders can receive 5 per cent. return upon a purchase at the present price. The total to be gained exceeds the expected profits during 1895 of the whole of the Transvaal mines.

Among other Land shares the variations are frequently in a downward direction, and but those shares with any influential backings are either unchanged or higher. Barnato Consolidated naturally advanced, and are now nearly 5½. Johannesburg Waterworks were also strong at about 3, but Johannesburg Investment have fallen. South African Gold Trust were easier at 9½. London and Paris also declined to under 4, and Rand Exploration declined about 15s. to 4½. These shares are to be settled in next account, and the fact attracted sellers. Consolidated Gold Fields at one time relapsed to 12½ sellers, but buyers have since come forward, with the result that the shares have closed at 14½. Dealings are reported in various new enterprises, and the shares of a new South African finance company, called the Austral-African, are said to have changed hand at 2½. This company owes its existence to a group connected with the New African, Oceana, and Mozambique Companies. Such as Matabele Reefs are higher upon a favourable cablegram, and another or kindred undertaking, called the Bambesi Gold Reefs, have sprung into prominence at 5s. Orange Free State fell ¼ to 4; Woodbyrne Ayrshire were also flatter at 2, and these shares, too, will settle next account. The Lydenburg companies have declined, E-tates being offered at 3, or over 7s. 6d. lower. Willoughby declined ¼ to 1½; and Waterfalls (Hill's), after being 35s. on Saturday, fell to 19s.-20s. Klerksdorp, too, are weaker, and a fall occurred in Anglo-French Syndicate to 4½. New African Exploration fell to 2½ prem., African Estates to 2½, New African recorded to below 8, Transvaal Consolidated touched 2½, Zambesia Exploring to 4½, each of these being ¼ or more down. Sellers controlled Straits Development, which relapsed to 1½. Oceana relapsed to 3½, closing at 4, and Ocean Minerals dropped to 2. Small declines were also registered in Read's Drift at 4, likewise among Transvaal and General Association at 4, and in Transvaal Gold Fields at 4½. Henderson's and Steyn Estate have suffered moderately. Tati Concessions and others of that class are generally lower, while Kafir Consolidated were, at one time, nearly unsaleable at 2½. We understand that an agreement for the sale of certain of the Henderson Company's properties to the South-East Rand Company has been signed and provisionally agreed to. There was a further decline in Potchefstroom, and the fall, which has amounted to nearly £1 during the past month, is now accounted for by an announcement that the Buffelsdoorn Reef on the estate has so far been shown to be of little value, but a recovery from the lowest point is shown.

With regard to the prospects in Zoutpansberg, the railway difficulty about the extension of the Silati Railway is said to have been settled, and that work has been recommenced. When this railway is completed considerable activity is looked for in mining properties throughout the country in which the Sutherland Reef and Harmony properties are located, but this is looking far ahead, particularly as properties on the Murchison Range require to be provided with abundant working capital, for owing to the disturbed nature of the ground the outcrop working may be unsatisfactory and no trustworthy results can be expected without deep sinking.

West Australian Mines.

This section has suffered more than the Kafir circus, because prices do not possess the same elasticity or recuperativeness. A feature has again been the activity of Great Boulton's, which rose to nearly 5 on the announcement of a crushing of 160 tons yielding 13,110 ounces of gold, but declined to 4½. Mainland Consols have risen to 3½, and Westralia to 2½. Pilbarra are lower at 1½. Among other colonial issues, Bendigo Gold Fields have been as high as 14s. 6d., but close a little lower. At a meeting, although a dividend of 100 per cent. could have been declared, this was not done for the present. Gorn of Cue, West Australian Gold Fields, Hampton Plains, &c. have developed firmness throughout. In the demand for low-priced West Australian shares, Waldon's Find at White Feather have been extensively dealt in, large purchases following the receipt of a cable from the manager announcing that he is now working the new eastern reef, raising good stone, 5 ounces per ton, solid formation. Westralia (Limited) have a greater run up from 1½ to 2½. The whole of the capital (£100,000) of this company is asserted to have been privately subscribed, and already a handsome profit has been made. These shares are being manipulated by the same parties who introduced the African Gold Properties, whose shares are still nearly £1.

Miscellaneous.

Rio Tinto and other copper mines have been actively dealt in, and are better, though the former, at 18, are under their best. Indian gold shares have improved a trifle, Mysore to 2½, 2½, because the company has received the following cablegram—viz: "Heavy shower; now running 90 stamps, two sets tailings and cyanide plant." Oregum shares in consequence also improved, changing at 3½ x.d., but Mysore Reefs remain weak at about 2½. Waihi Gold are 2s. 6d. better at 7½. Achilles easier at 4s., though Kapanga, Hauraki, and the rest have been firm considering. Queensland properties were quietly steady.

British Mines.

The Cornish market has been quiet all the week, and has received but little support from any quarter, but holders of shares are not sellers at quotations, and it has been difficult to buy or sell during the last few days. A few Dolcoaths have changed hands at 10s., and the partly-paid shares at 1s., 2s. prem., but at the

ALMADA AND TIRITO.—Report for the month ending July 27: Guadalupe. The No. 1 shaft is now in good repair, and we have again commenced to sink. The total depth is 128 feet, 8-2 feet having been sunk during the month. The No. 2 shaft is now 172 feet deep, which corresponds to a depth of 150 feet in the No. 1 shaft. We have commenced the 150 feet crosscut west in order to intersect the main lode. During the past fortnight we have passed through the Eastern or European lode, which is massive and mineralised throughout. We cleaned $\frac{1}{2}$ ton of ore yielding 32 ounces silver per ton, but the ley is very variable, the galena ore, of which the lode is principally composed, being very low. A short crosscut east from the bottom of the shaft will now be driven, from which we shall drive north and south on this lode. The lode has splendid appearance, and should the grade slightly improve in the drifts we shall doubtless open up some good paying ground. The No. 3 shaft was cleared to 96 feet deep, and having reached the bottom we shall now commence to sink. The tunnel was extended 18-5 feet by four men. The lode is well defined, composed of quartz with occasional green stains. The stopes at Balvanero and Tirito shafts are yielding paying quantities of good grade ore.—(Signed) John Nite.

MOUNT ZEEHAN (Tasmania).—The manager reports for week ended July 9:—Silver Queen section, No. 8 lode, No. 4 shaft. Sinking has been continued, but no measurements taken owing to accident to clock-piece of wind-bore, which we expect to get remedied within a few days. No. 1 level north extended by tributaries 8 feet, total 73 feet. Lode not so good as previously, but in the bottom it looks well, and maintains former value. G tribute on this section is looking remarkably well. The tunnel is in 130 feet, and the lode averages in the end 1 foot of first-class ore; 7 tons lately sampled showed 79-5 per cent. of lead and 135 ounces of silver per ton; 3 tons 12 cwt. of ore from shaft now being sunk on this tribute assayed 78 per cent. of lead and 112 ounces of silver per ton. The lode in bottom of shaft averages 1 foot of first-class ore.—Concentrator. Have restarted concentrator, and crushed for our tributaries 102 tons seconds, and for ourselves 12 tons seconds, producing 4 tons 15 cwt. concentrator, containing about 3 tons 7 cwt. of lead and 332 ounces of silver.

NAMAQUA COPPER.—Abstract from superintendent's report for June:—125 fathom level east. The rock is of a darker colour, but as yet of no value.—115 fathom level east, No. 33 winze. At this point the lode has a very promising appearance, and there is a larger proportion of blue ore. Worth 6 tons of ore per fathom.—105 fathom level east, No. 32 winze. At this point a communication has been made to the 115 fathom level. Worth 5 tons of ore per fathom.—105 fathom level west. The part of the lode seen in the driving has somewhat improved, and a further improvement is looked for. Worth 2 tons of ore per fathom.—95 fathom level west. At this point a patch of quartz has disordered the lode, and it is not of so much value as for some time past. Worth 3 tons of ore per fathom.—95 fathom level west, No. 34 winze. This winze is being sunk in a very promising lode. It will be continued to the depth of the 105 fathom level, and when that level is connected with it, a large section of ground will be ready for stopping. Worth 5 tons of ore per fathom.—85 fathom level west. There is no change here to notice.—Stopes: No. 1 bottom of 105 fathom level west, No. 2 back of 105 fathom level west, No. 3 bottom of 95 fathom level west. These stopes continue to yield well, and are worth respectively 6, 8, and 9 tons of ore per fathom.—New shaft: 25 fathom level west. The lode is somewhat disordered, but there are signs of improvement again as the work proceeds. Worth 4 tons of ore per fathom.—Stopes in the back of the 25 fathom level. Two stopes are being worked in the back of the level. They show a great breadth of ore, and are producing large quantities, chiefly of yellow ore. Worth 8 tons of ore per fathom.—No. 4 shaft, intermediate level north. The driving here will be continued about 6 feet further in a northerly direction, after which it is intended to extend it both east and west on the course of the lode, and there is every appearance that it will pass through a large body of mineral. The present value of the lode as seen in the forebrest is 8 tons of ore per fathom.—Output for July. 500 tons of ore of 26 per cent.

PORT PHILLIP.—The tributaries working in the Port Phillip and north portion of the South Clunes ground are getting good results, the latest crushing averaging 10 dwt. 16 grains and 11 dwt. 21 grains per ton. As soon as the company restarts its plant a large number of extra tributaries can be set to work.

WESTRALIA PREMIER.—The following is an extract from Professor Nicholas' letter, dated Coolgardie, July 16:—I am glad to tell you that I think the mining operations are ripening now for improvement. Hitherto I could not even say this much. The mine is on its trial, and a few weeks will settle any doubts about its future to a large extent. This will account for my reticence re gold. The prospects in both crosscuts, in 50 feet main shaft and 100 feet in boundary shaft east crosscut, in both places the quartz is assuming more the character of auriferous stone than previously. If anything worth a cable is out I will use the cable at once.

ZEEHAN-MONTANA.—The manager reports for month of June, all work on the various lodes is proceeding satisfactorily. No. 6 lode. The surface drive on the course of this lode has been extended 64 feet on the whole distance and is at present from 1 to 2 feet wide. Assay of clean ore taken from the face shows 80 per cent. lead and 147 ounces silver per ton. This lode is looking well, and I have never seen a better show on the mine. The return for the month are 105 tons of first class ore containing about 67 tons 5 cwt. of lead and 10,539 ounces of silver valued at £1359, in addition we have 308 tons second class ore of a value of about £320. The raising costs for the same period were £1125 including development work.

DEPARTMENT OF SCIENCE AND ART.—The following is a list of candidates successful in the competition for the Whitworth Scholarships and Exhibitions, 1895:—1. Scholarships (tenable for three years.) Arthur H. Barker, engineer; George W. Shearer, apprentice engineer; Percy Nicholls, engineer; Harold E. Cullen, engineer.—2. Exhibitions (tenable for one year.) Charles E. Goodyear, shipwright; George M. Brown, draughtsman; Norton Baron, engineering student; Harry Jackson, engineering student; Edward M. Lefluff, engine fitter apprentice; Arthur E. Hyne, fitter apprentice; Robert McMillan, engineer apprentice; John W. Roebuck, fitter; George Fellows, engineer; Arthur J. Baker, engine fitter apprentice; William D. Ross, fitter; Frank H. Phillips, engineer apprentice; Henry T. Hildage, fitter; William P. Jones, marine engineer; John W. M'ner, mechanical engineer; William Rayliss, apprentice fitter; John B. Shaw, engineer; James Walker, engineer; William H. C. Kempe, engineer apprentice; William J. Talbot, engineer; Henry C. Tieg, draughtsman; Duncan R. McLachlan, engineer; George A. Robertson, engineering student; Charles H. Imrie, engineer; William McG. Wallace, apprentice fitter; William J. Gow, apprentice fitter; William Lauder, draughtsman; Samuel A. Clarke, draughtsman; Edmund B. Ball, engineer student; James W. Ashdown, engineer apprentice.—List of successful candidates for Royal Exhibitions, National Scholarships, and Free Studentships (Science), 1895.—Edmond R. Verity, student; George Patohir, engineering student; Harry Jackson, engineering student; William Ditchburn, jun., teacher; Thomas S. Price, student; Franz K. Städt, tailor; Herbert Bailey, student; William Bennett, student; John W. Barker, laboratory assistant; Thomas G. Hill, student; Ernest A. Scott, student; Charles E. Goodyear, shipwright; Edward M. Lefluff, engine fitter apprentice; William H. James, student; William T. Clough, student; Herbert Halliday, student; William Cameron, laboratory assistant; Ernest Hibbert, student; Sidney E. Lamb, engine fitter apprentice; Joseph Lister, teacher; William Parker, student; Ernest T. Harrison, laboratory assistant; George E. Clarke, student; Edward C. Hagon, student; Thomas G. Proctor, engine fitter apprentice; John A. Tomkins, scientific instrument maker; William T. Swinger, engineer; John W. Roebuck, fitter; Robert L. Wills, shipwright apprentice; William D. Ross, fitter; Leonard W. Cox, student; Edgar R. Sutcliffe, engineer; William P. Jones, marine engineer; Percy M. Hampshire, lecture assistant; William J. Talbot, engineer.

EL CALLAO MINING COMPANY.

Report of the directors presented at the meeting held in April last.

THIS report, which has just been sent to the Press, is as follows:—"The general assembly meets to-day with only the representatives of 6238 shares, out of the 257,600 shares forming the company, after the three convocations prescribed by the Articles of Association and the Commercial Code. Is it that the great majority of the shareholders, residing far from Ciudad Bolivar, confide absolutely in the board of management, or is it that they take no further interest in the working of the company, because they consider it a total loss? If the former, the board of management has to express its gratefulness for such an unlimited confidence being shown to them; but, at the same time, laments the want of attendance, because if the company is still in activity, it is due to the efforts of the board of management; and amongst the shareholders there are many whose attendance at the general meetings would efficiently contribute to surmount obstacles which may present themselves to the administration, and which would be surmounted with difficulty by the board alone.

"At the beginning of the year 1883, the general meeting fixed the capital of the company in the sum of 32,200,000 bolivars in shares. When this operation took place the company had spent more than 38,000,000 bolivars, and were in possession of the rich lode of El Callao, which produced enough gold to meet the heavy expenses and to yield large dividends, to such an extent that the shares were eagerly sought after, at a price higher than double their nominal value. But in 1887, against all foresight, the lode disappeared, and as at first it was thought that its disappearance would not be absolute, but that we would find it again in some other direction, we did all we could by commencing very expensive explorations in all directions, but without any satisfactory results. Convinced, at last, of the futility of our efforts, we decided to work the pillars left holding up the mine exploited, and to suspend, therefore, all further works of exploitation. When once the extraction of the pillars was carried out, the mine had to be abandoned, and to-day is completely flooded. In this state of affairs the only thing left to the board of directors was to call a general meeting, in compliance with Article 204 of the Commercial Code, once that the capital of the company, which in its greater part consisted of the rich lode of El Callao, had diminished not only to the third part set forth in that law, but in a still greater proportion.

"The general assembly having met to be informed of the state of affairs, were left to decide which of the following courses should be followed:—To put the company in liquidation; to make up the capital, or, otherwise, to limit the social capital to the existing capital, which, after limitation, would be sufficient to carry out the object for which the company had been formed—viz., to work gold mines. When El Callao arrived at this state, all the other mining companies established in the mining zone of Yuruari were in a state of bankruptcy; and in view of the fact that the President of El Callao, since 1886, had devised and submitted a project to concentrate the works in one of the various companies by establishing a large central mill, and building railways to carry the ore from the different mines, all believed the time had come to put the project into execution, and to carry it out the Colombia, Nueva Panama, Potosi, Hansa, Venezuela-Austin, and other companies offered themselves successively. But what would have been the equitable and practical means to carry out the plan when dealing with gold mines belonging to companies that had sunk large capitals in them? The centre of the industry would always have to be the El Callao, because of possessing greater advantages for treating the ores, and owing to its topographical situation offering the greatest facilities for the development of the railway lines, which would put its mills in communication with the various mines providing the raw material.

"Those interested in the El Callao would most likely have asked that their capital of 32,200,000 bolivars should remain unaltered, if they were to form part of the combination we are referring to, and the shareholders in the other companies would probably have required as a primary condition to appear with a capital in proportion to that of El Callao, and thus the social capital of the new undertaking which there was a thought of establishing, would have amounted to 50,000,000 or 60,000,000 bolivars, all nominal, without having any cash to meet the working expenses. This plan could not have been recommended or accepted by the board of management. The most equitable and most practical manner would have been to give to each company an approximate value in accordance with the state of their properties. To establish it with exactitude would be utterly impossible when dealing with gold mines subject, from day to day, to important fluctuations in their intrinsic value. The old bonds should be cancelled and new ones issued of a value in proportion to the reduced capital, reserving a number of shares to form a working capital.

"This project was thus more feasible, inasmuch as the interested parties in the Venezuela-Austin had offered, from London, to take shares to the amount of £20,000 of those issued to raise the working capital; but in such a scheme as this the shareholders of the El Callao Company would see the value of their bonds notably reduced, and for this reason the board of management have preferred to enter into other businesses which result in their recouping in other mines the part of capital lost in consequence of the lode giving out. We have established the system of contracting for the exploitation of mines, which we consider can pay the expenses and leave profits, acquiring for the company, the half of the property whose work is so contracted for, which is equivalent to having a right to the half of its net proceeds.

"This operation has been carried out:—
With the Colombia Company, the Callao receiving the half of its capital, which consists of 4,000,000 bolivars b2,000,000
With the Nueva Panama Company, half of its capital, which is 5,000,000 bolivars 2,500,000
b4,500,000

"The amount of capital acquired by the El Callao Company, compensates in a similar sum a good part of the loss in its mine. To put in full working order these lodes and some others lying in grants of the El Callao Company we have to complete the construction of 13 kilometres of railway line, eight in the valley of the Quebrada Napucay, of which five are already finished and in working order, being those which put our mill in communication with the Remington lode, the property of the El Callao, and with those of Caratal and Tigre of the Colombia. This line has to be lengthened 3 kilometres to join the mill, also to the lodes Santa Maria and San Felipe, the property of the El Callao, formerly of the Union. The other branch line to be built measures 5 kilometres, and will serve to bring the mill into communication with the Panama and Lagunita lodes, situated in the grants of the Nueva Panama. When once these railways are completed we shall have con-

nected our mill with the lodes Remington, Caratal, Tigre, Santa Maria, San Felipe, Panama, and Lagunita. All of these seven lodes contain auriferous quartz. The amount of material that they may yield, and its richness, can only be ascertained by their exploitation; but we believe that there is no reason to doubt that two or three of them will show good results. All the mines, the mill, and the railway, will be managed and directed only by one board of management, a superintendent, and a staff of engineers, miners, and mechanics—the only system which promises to leave a profit from the economy in expenses. The exploitation would not result so favourable if each mine had separately its mill and a staff of employees. We have great confidence in the success of the plan we have adopted, always providing that we can finish the railways. This could be done in the course of the present year; but if the Remington and Colombia Mines—the only ones which we are working—do not yield sufficient gold to meet the expenses, inclusive of those caused by the construction of the projected branch line and the opening of the works of other mines which we are thinking of exploiting, all our combinations may be wrecked, and we should be brought to the extremity we wanted to avoid, which is to submit to the provisions of Article 204 of the Code of Commerce. Since we decided to put our working plan into execution, we foresaw that we might fail for want of money to finish the railways, and we accordingly communicated with the agents of the company and with some of the principal shareholders, soliciting at the same time a loan at a high premium and interest if at any time it were necessary, but up to the present nothing has been done in the matter.

"It is true that up to the present we have not required it, but in the course of this month or the beginning of May next we expect a ship from France, bound for San Felix, with 251 tons of rails, Decanville, the transport of which to Callao and the laying down we calculate will last during the whole month of September if the winter is not very severe, and will require an approximate outlay of 250,000 bolivars, which we have not in hand at present. We can only obtain this sum either from the exploitation of the Colombia and Remington Mines or by means of a loan. For the latter, the board of management is sufficiently authorised by the general meeting at their extraordinary sitting held on January 6 of the current year. If, however, both these resources should fail, we cannot answer for the consequences.

"Mr. Barry Searle is the superintendent, who has drawn up the plans for the railways and built the 5 kilometres which are now in perfect working order. He has begun and followed up the working of the Remington, Caratal, and Tigre mines, and has reported to the board of management the importance of the exploitation of the Panama and Lagunita mines, and on the manner to carry it out. He has had to go to the United States, but has promised to return in May to take over the management, accepting a salary of 40,000 bolivars per annum and 100 shares of the Nueva Panama Company, he, on his part, undertaking for two years the general management of all the mines of the El Callao group."

The statement of accounts and other details, which are voluminous, are published with this report, a copy of which, we are requested to state, can be obtained on application to the Secretary of the company, at the offices, 8, Bishopsgate-street Within, E.C.

THE REPORT ON PUBLIC COMPANIES.

THE report of the Committee appointed by the Board of Trade last November to enquire what amendments are necessary in the Acts relating to joint-stock companies incorporated with Limited Liability, is in our hands. The Committee was, it will be recollected, a strong one, and consisted of Lord Davey, Mr. Justice Chitty, Mr. Justice Vaughan Williams (the Judge in winding-up matters), Sir William Houldsworth, M.P., Sir Albert Rollet, M.P. (the President of the London Chamber of Commerce), Mr. Buckley, Q.C., and Mr. Palmer—whose works on the Companies Acts are in every practitioner's hands—Mr. John Smith (Inspector-General in Bankruptcy), Mr. Alexander Wallace, Mr. John Hollams, and Mr. Frank Crisp (of the great firms of solicitors, Messrs. Hollams, Son, and Coward, and Messrs. Ashurst, Morris, and Co.), Mr. E. Waterhouse and Mr. George A. Jamieson. The special view the Committee were to keep before them was the better prevention of fraud in relation to the formation and management of companies.

Owing to the constitution of the Committee, and having regard to the large experience in the administration of company law of some members of the Committee, it was not considered necessary to examine many witnesses. The Committee, however, availed themselves of the evidence taken before previous Committees of the House of Commons, and suggestions and assistance were invited from various quarters, such as the London Chamber of Commerce, the Associated Chambers of Commerce, the Chambers of Commerce of Manchester, Leith, and Liverpool, Mr. Ogden (the President of the Association of Trades Protection Societies), the Committee of the London Stock Exchange, and the Committees of the Stock Exchanges of Aberdeen, Bristol, Newcastle, Edinburgh, and Glasgow; Mr. Purcell, C.B., the Registrar of Joint Stock Companies; Mr. Frederick Whinney, the chartered accountant; Mr. Edouard Claret, of Paris, upon the practical working of the Statutory Regulations of companies in France; Mr. Ernest J. Schuster (Munich), as to German Law as to companies; the Institute of Secretaries and others whose valuable memoranda are appended to the report.

Starting with the trite observation that legislation cannot protect people from the consequences of their own imprudence, recklessness, or want of experience, the Committee remind us that the majority of companies are honestly formed for carrying out a legitimate though it may be a speculative enterprise. Owing to the facility which exists in England for the formation of companies, much foreign business comes here, and thus banking, railway, and other business is carried on and managed in all parts of the globe with English capital and officials, the capital embarked in English companies exceeding that in French and German together by £315,000,000. When such vast and recognised interests are concerned, it is not strange that it is found that the Committee have proceeded in their recommendations with care and caution, not lightly entertaining restrictive provisions which may have the effect either of curtailing the facilities for the formation of such companies, or of deterring the best class of men from becoming directors.

The maxim of *caveat emptor* has but a limited application in subscribing for shares, as the time after the issue and the making of the application is ordinarily so short that no opportunity is allowed for independent enquiry. It is important, therefore, that the prospectus should contain no misrepresentation, but should satisfy a high standard of good faith. Frequently applicants are indifferent to the terms of the prospectus, buying, not for investment, but for speculation to sell again at a premium. If the law gives the means of information and people will not avail themselves of it, it is not the law that is in fault. The Committee, recognising that the interests of shareholders and creditors, although diverse, are not necessarily adverse or

NOTES FROM ANDALUCIA.

PAPER ON THE CUPREOUS PYRITES DEPOSITS
OF ANDALUCIA AND ALGARVE.

RETROSPECTIVE AND PROSPECTIVE.

Extracts and Notes from Mining Operations and
Reports on these during the past 25 years.

By WILLIAM GUTHRIE BOWIE.

(Continued from Page 981.)

THE rest of the copper mines in Spain seem to follow the same tendencies, but as these are chiefly copper pyrites lodes they do not come under consideration here. But lately some in Portugal, in Beja, as those of Senores, Pulido—before referred to—have been inspected. These mines have been worked from time to time, and stopped, &c., filled with water and so on; the ore has always been rich, but somehow, quantity and costs have not been favourable, and, perhaps, a good strong company may by better mining and appliances succeed, especially as gold is now, according to the prospectus, a leading feature in these ores. It may also be remarked in respect of copper pyrites mines that several of the mines in Linares, now being worked for galena, had copper pyrites in the upper zones, which gave way to galena as depth was gained; also similar cases are known in the Provinces of Malaga, Granada, Almeria, and Murcia, and as these changes were evident in the times of Rua Figueroa, probably he may have based his theory of Rio Tinto becoming a silver mine on some of these. Also it may be remarked, and will again be referred to under nature and origin of these masses, that recent observations in respect of the liquors in the abandoned mine and their contents and disposition to classify themselves in zones of more iron, and less copper, and vice versa, also support to some extent this theory; but so far as these tendencies go, they are towards less copper in depth, and more iron pyrites, &c., and show that the reverse is evident in respect of the class of metals of value as Figueroa expected or estimated, but as already advised, more attention to assaying these deepest and poorest ores is necessary to determine the changes as to silver and gold.

From the foregoing list it will be observed that many mines have been worked by pillar-and-stall, and are stopped and full of water. This system, which is the worst possible to adopt for these masses, has, however, had its advantages—as at least three-fifths of the best ore still remain in them to be yet exploited, while, if full of water, this also has its advantages as there being no circulation of air, there is no oxidation or "sulphatisation" (this is sometimes called "vitriolisation") of the ore, or its copper content, hence there is hardly any depreciation in copper in these masses so preserved. Also the mines having railways of their own as Rio Tinto, Santo Domingo, Tharsis, Caluzas del Pasto, Sotiel Coronada, Zalamea, Valverde, and Almonister or Cortigana, which, while still having useful ores—especially, Rio Tinto in its "San Dionisio" mass—can transport a considerable number of tons of ore for some time yet, as well as increase in some cases, if pushed, the local treatment; yet with all these advantages, it will be easily seen that immense over-calculations in all respects have been made, and that another 25 years' exploitation at the same rate in tons of ore, must depend upon our ability to extract from below and treat at the mines these deepest masses, which are positively proved to be of an extremely low grade in copper, and are now also in immensely contracted masses; thus these railways and piers will in the near future depend upon copper precipitate and pyrites for its sulphur to occupy them and pay their costs.

Resuming the evidence as to decrease in depth and the observations made during these operations of exploitation and investigation, we are now enabled to make comparisons in respect of the extent of their respective outcrops, and compare those of the exhausted masses with those still in exploitation, as well as estimate the depths at which they become so poor in copper as to be virtually, so far as we at present know, only useful for sulphur and iron, and arrive at rules whereby to guide us in their future estimation in quantity and quality. To some extent these are indicated in the Memoirs de la Comision del Mapa Geologico de España: Province of Huelva, Vol. II., Pages 182, 196; by Don Joaquin Gonzalo y Tarin, Ingeniero. Gefé del Cuerpo de Ingenieros de Minas de España, dated up to 1888, where, after studying the various evidences partially indicated in the foregoing remarks, he fixes certain ratios between the wide masses, their length and depth according to the superficial content of their caps, and another ratio for the narrow—but longer in proportion to width—masses on similar appearances; the wide masses being those cutting out soonest, and having less proportion in depth to width at surfaces, while the narrow ones hold down further in this proportion to their width. He concludes as follows, given in his own text, p. 195:—

"De los diversos ejemplos que acabamos de exponer y de otros muchos que pudieramos presentar, se deduce que las grietas donde las sustancias piritosas se depositaron son bastantes someras, o por lo menos que se cierran unas y tienden otras a cerrarse muy marcadamente en las profundidades a que se ha llegado con los trabajos actuales; no siendo probable el que a mayores honduras vuelven a reproducirse ofreciendo nuevos depositos hasta ahora desconocidos.

"Nuestras investigaciones, en efecto, nos han dado la conviccion de que, en general, la profundidad que alcanzan los criaderos piritosos de la provincia no es muy considerable."

Since the above was written we have still more positive evidence of this cutting-out, combined with the even more formidable difficulty of poverty in copper at the same time. Besides these evidences in the exploitation we have others in the geological formation, as well as geographical surroundings, which are deferred until these are considered apart along with the probable origin of these masses, which also go to prove the above opinion to be correct.

It now remains to present some positive proof of this difficulty of poverty in copper, and the extension of useful cupreous pyrites for this metal in depth. For this purpose we have to go back to the past workings, and see how the list of mines, which, all at first exploited paying ore, now shows these in great part abandoned, as too poor to extract, and are filled with water, to obtain the copper sulphates formed during their exploitation in the upper levels. While the returns of copper from the total number of tons of ore extracted is under 2 per cent. as a general average, in the earlier portion of the past 25 years the average of this metal in the ore then extracted was higher.

(To be continued.)

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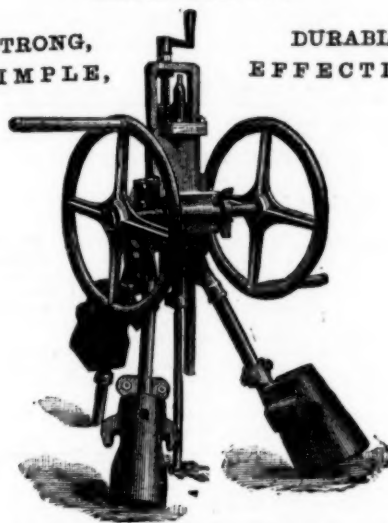
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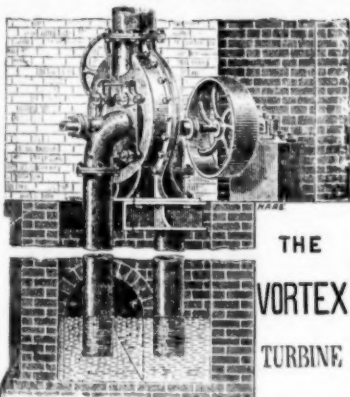


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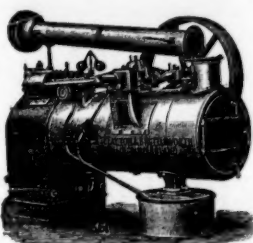
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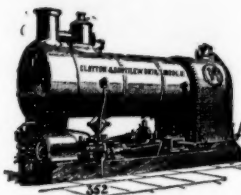
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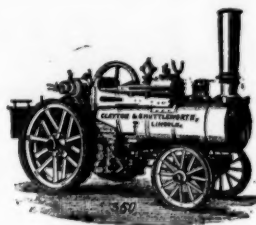
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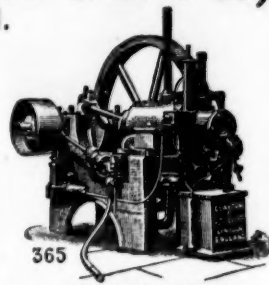
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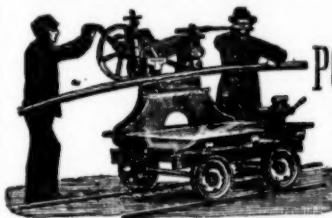
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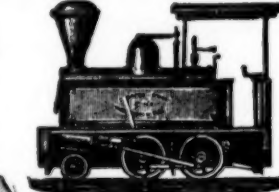
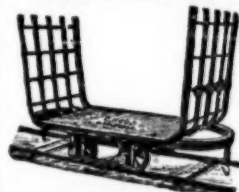
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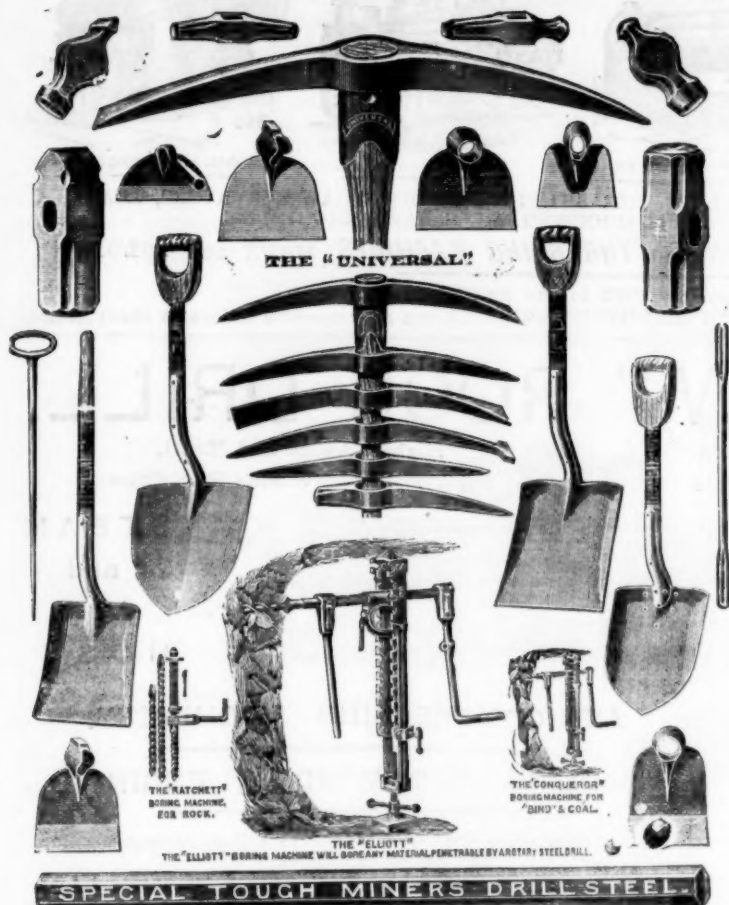
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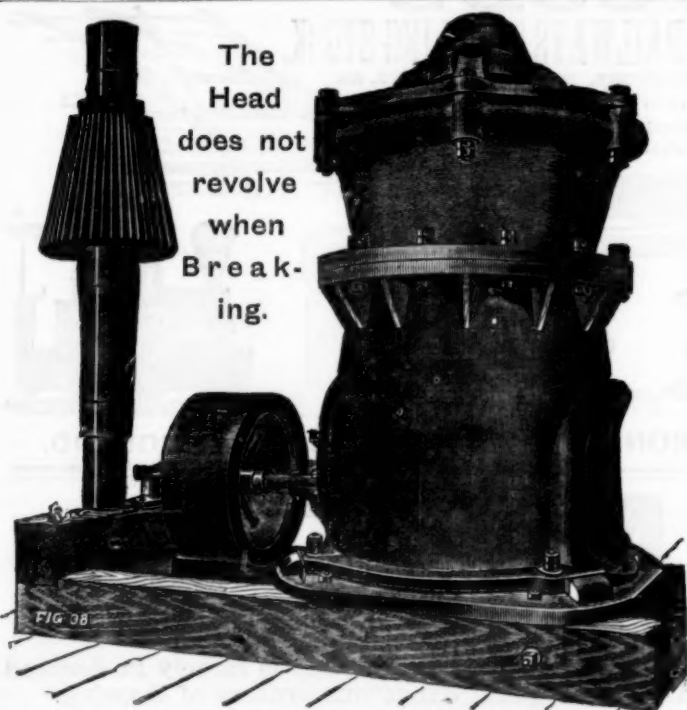
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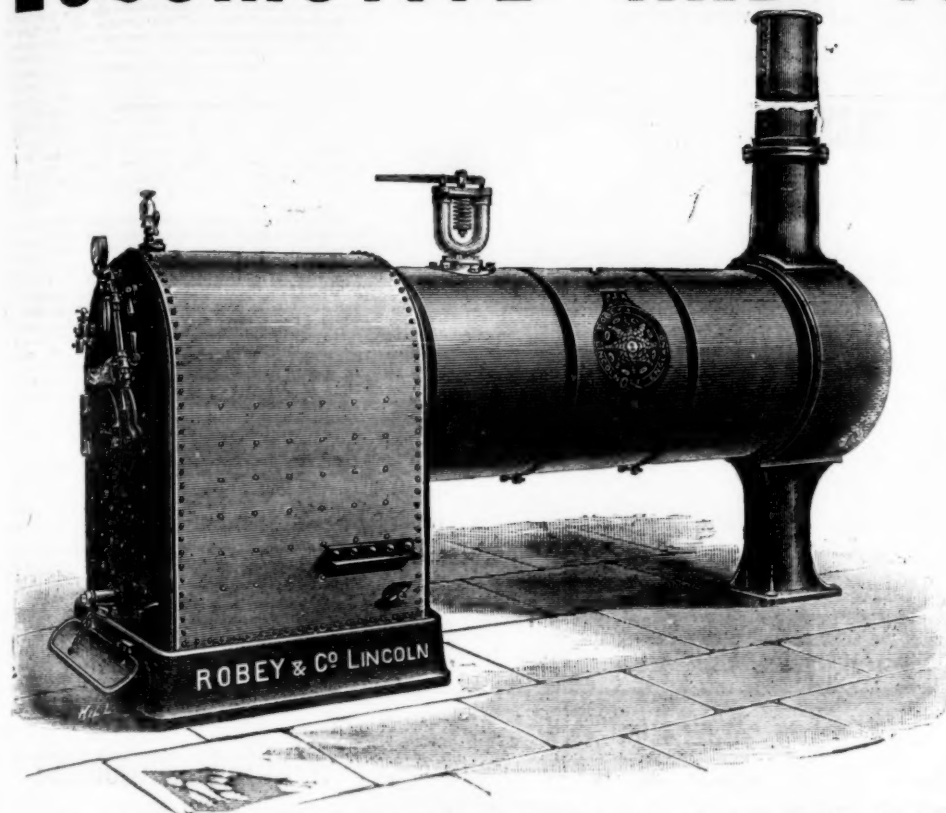
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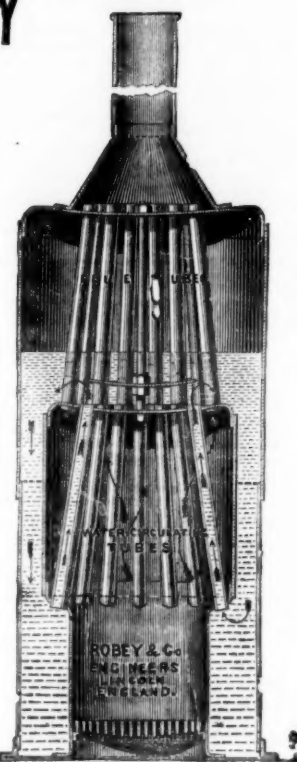


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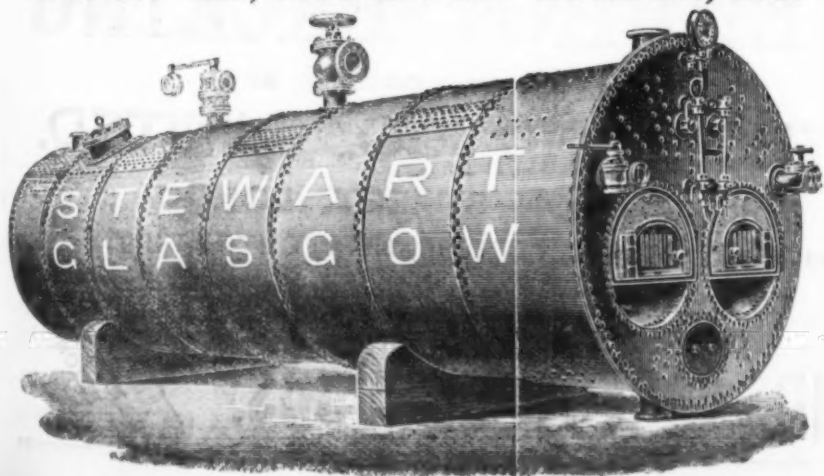
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The Fine Crusher we had from you in August last is an excellent pulverizer, and rapidly reduces hard material to a fine powder.

"The Pulverizer has now been working two months, and answers its purpose most satisfactorily."

"It is with the greatest satisfaction that we write these few lines in order to acquaint you that the 12x3 Pulverizer you provided us with, has quite fully given the results you represented to us, completely reducing our material to an impalpable powder at one operation. Should you refer any one to us we should have much pleasure in recommending the machine."

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"Our experience is that the motion and mechanical arrangements of your machine are the best for pulverizing that we have ever met with."

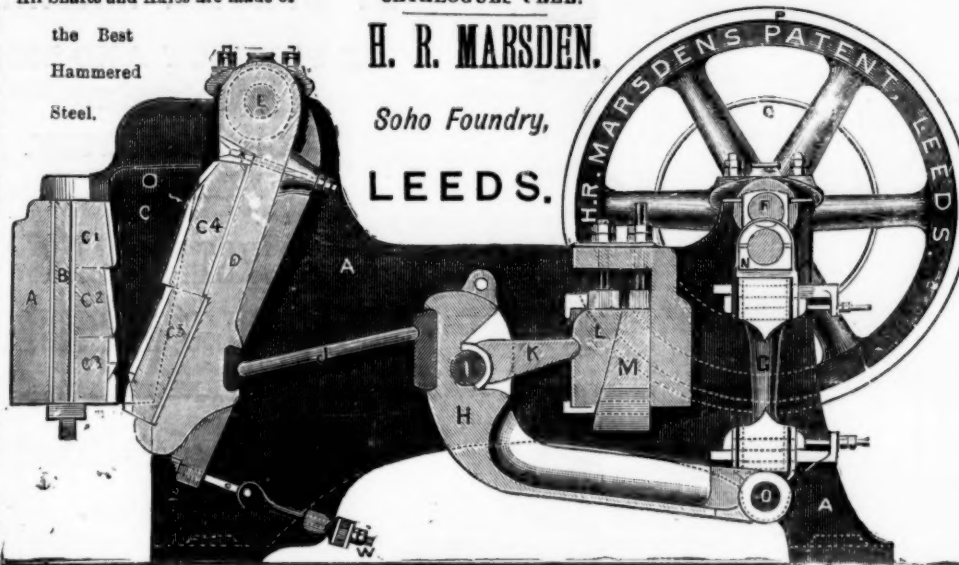
"The reports from our mines as regards the working of your Fine Crusher (20x5) recently supplied are very favourable, although we cannot quote you exact figures. On being got into position it was tried by hand, with the result that it made short work of the biggest pieces of ore we put into the hopper. You might say how long you would take to deliver another of the same size."

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